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NATIONAL DAM SAFETY PROGRAM. LOWER FULTON DAM (GRANBY)(INVENTOR--ETC(U)
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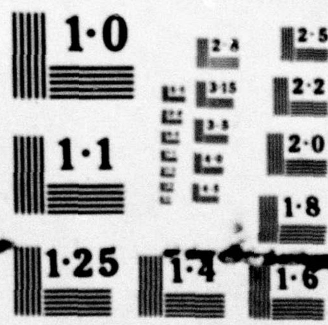

NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

OSWEGO RIVER BASIN

LOWER FULTON DAM (GRANBY)

OSWEGO COUNTY
NEW YORK

INVENTORY No NY 406

(11) 28 Sep 79

(10) John B. /Stetson [redacted]

(12) 171 (15) DACW51-79-C-0001

PHASE I INSPECTION REPORT
(6) NATIONAL DAM SAFETY PROGRAM

Lower Fulton Dam (Granby) (Inventory Number NY-406). Oswego River Basin, Oswego County, New York. Phase I Inspection Report.

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NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1979

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Lower Fulton Dam (Granby)
Oswego County
Fulton

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

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Additional structural investigations should be initiated and completed within one year concerning the stability and through-the-dam seepage. The remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified:

1. Repair the spillway slab and verify the structural integrity of the spillway section.

2. Investigate the interior of the dam to evaluate the condition of the old masonry dam, to refine the stability analysis and to evaluate the severity of through-the-dam seepage.

3. Repair the abutment walls which are severely eroded at the water line.

4. Repair the mechanical equipment which operates the sluice gates.

5. Investigate the structural integrity and repair the lock walls, particularly where the walls are attached to or adjacent to the spillway or where a hazard potential related to loss of life or property is presented.

Computations prepared according to the Corps of Engineers' Screening Criteria establishes the spillway capacity of 35,000 cfs at 43% of PMF with the PMF and 1/2 PMF flows at 81,900 cfs and 46,800 cfs respectively. The spillway has been determined to be inadequate to pass the 1/2 PMF, but retains stability under loads providing that the effective base section of the spillway as assumed in the stability computations of this report is verified. Therein, the spillway

would not be considered seriously inadequate based on the Corps of Engineers' Screening Criteria, since the dam would be stable under the 1/2 PMF.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam Lower Fulton Dam at Lock 3, NY406

State Located	New York
County Located	Oswego
Stream	Oswego River
Date of Inspection	June 7, June 13, 1979

ASSESSMENT OF GENERAL CONDITIONS

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

Additional structural investigations should be initiated and completed within one year concerning the stability and through-the-dam seepage. The remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified:

1. Repair the spillway slab and verify the structural integrity of the spillway section.

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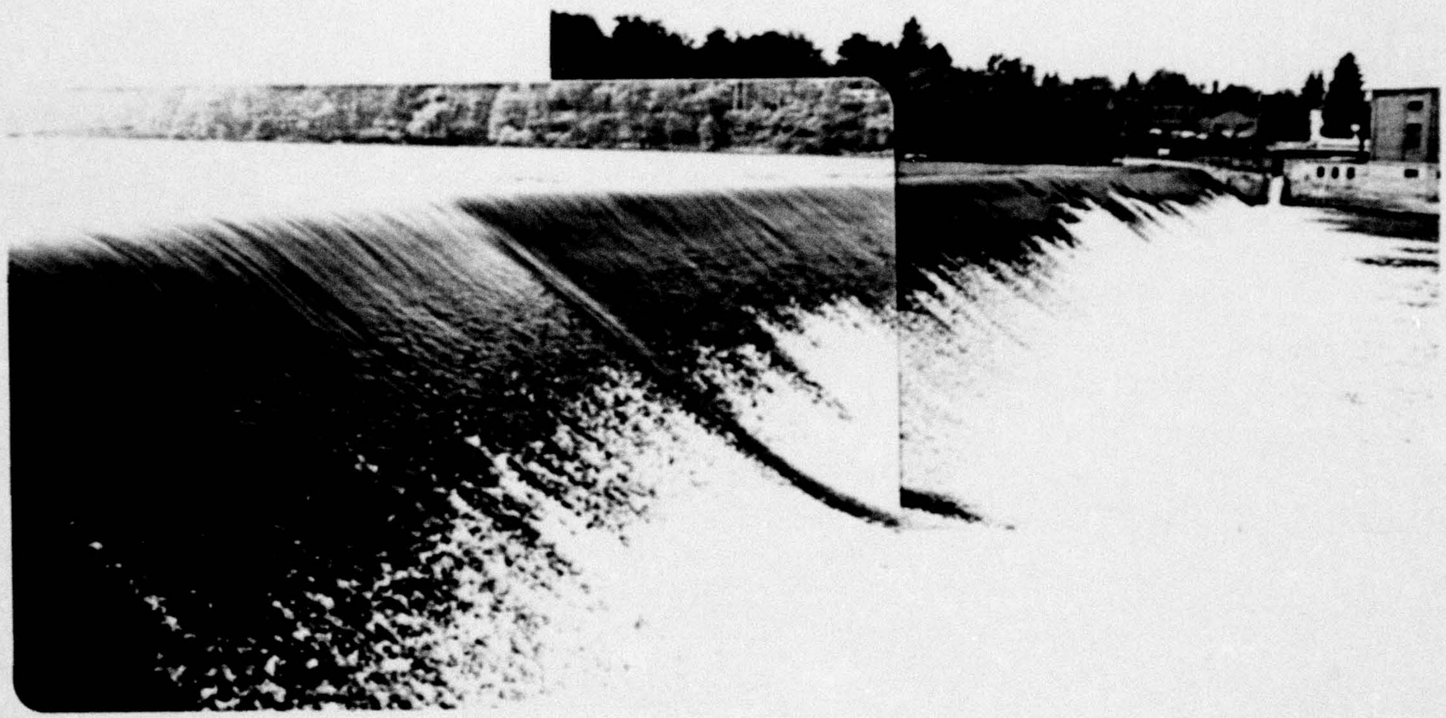
Dale Engineering Company

John B. Stetson, President

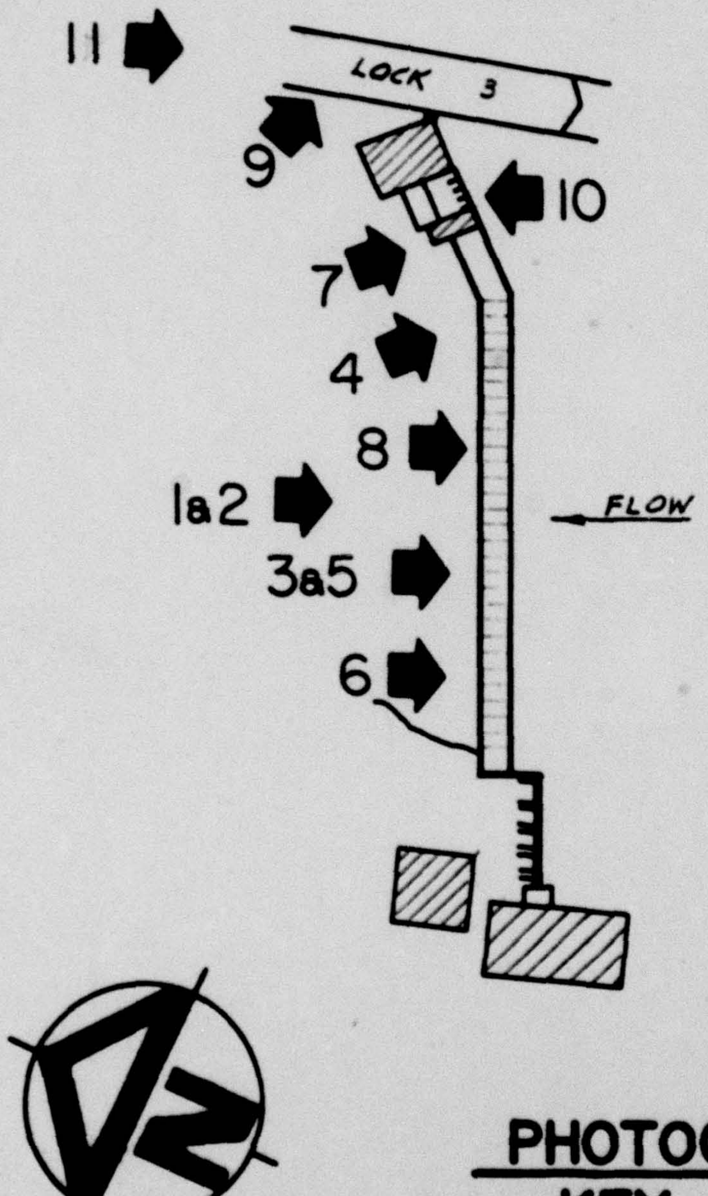
Approved By:

Date: 28 Sept 79

Col. Clark H. Benn
New York District Engineer



Overview of dam at Lock O-3 at mile 12 on the Oswego River in Fulton, New York (Lower Dam).



PHOTOGRAPH KEY MAP

STETSON · DALE

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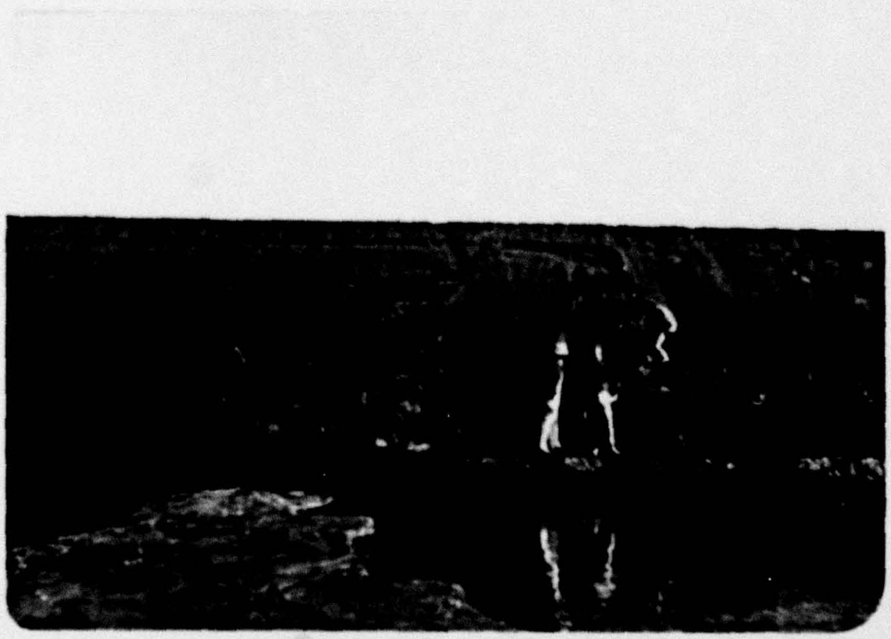
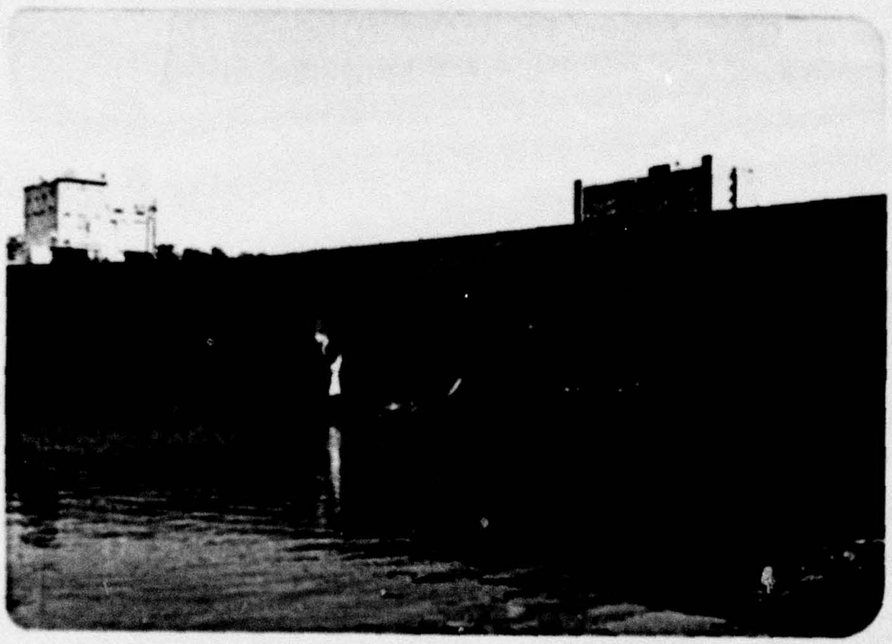
1. View of spillway with pool drawn down through power-house showing deteriorated spillway surface areas.



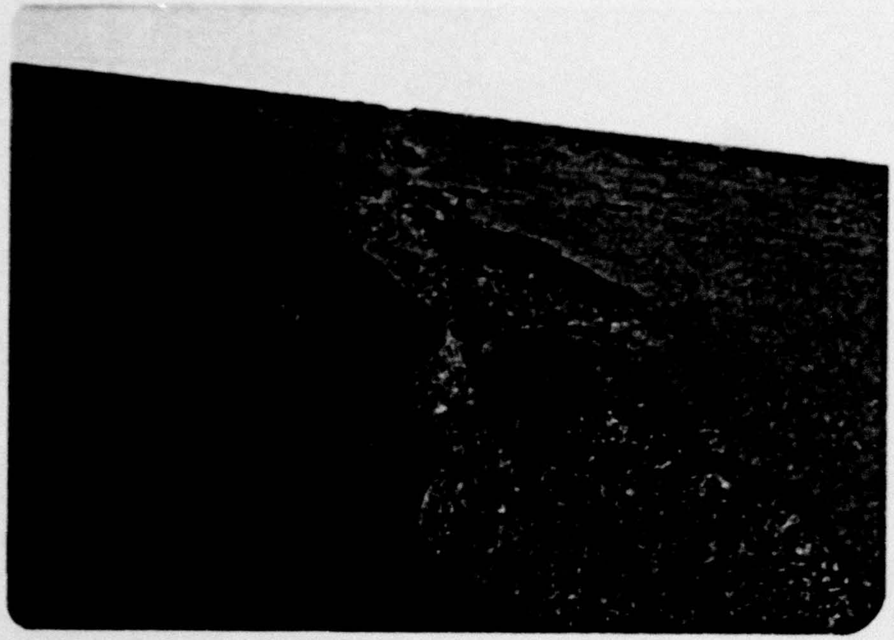
2. View of spillway area in left portion of picture number 1.

3. Close-up views of spillway area in picture number 2. Depth of removed concrete surface is 14 inches. The spillway is an 18 inch slab supported on 3 feet thick buttresses located 15 feet on center. The ogee spillway is a concrete overlay on the original stone masonry dam.



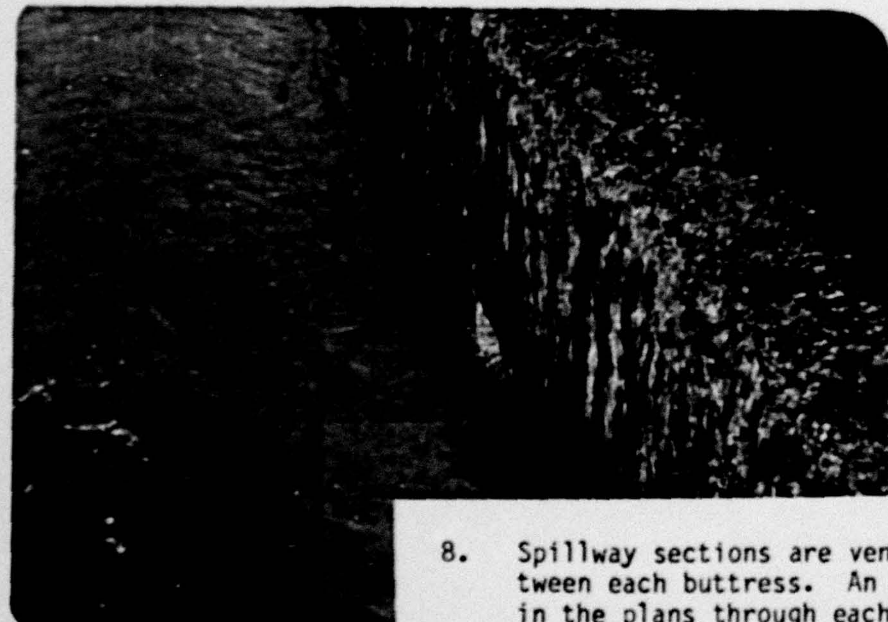
4. View of spillway section on east side of river (area not shown in picture number 2).

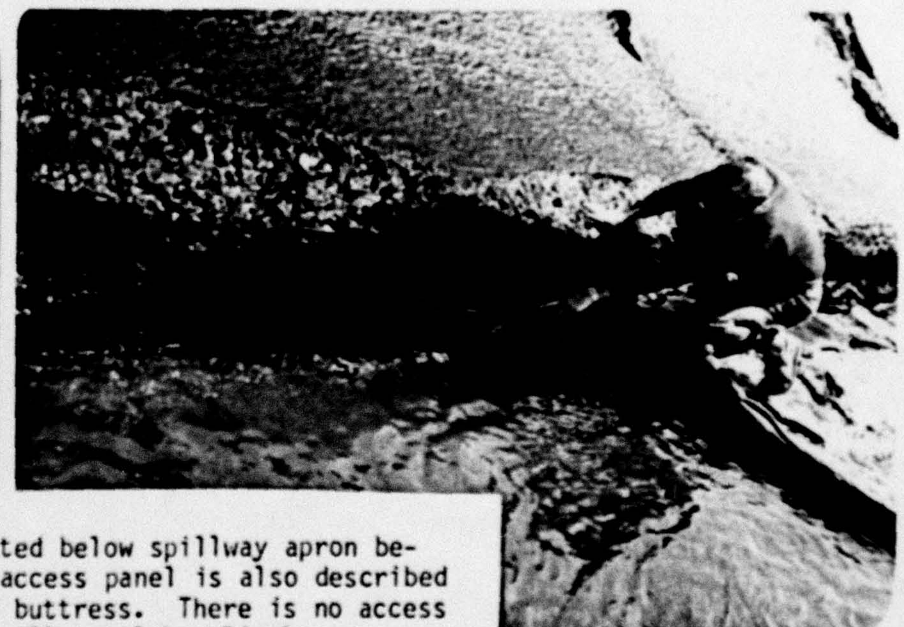
5. Close-up of deteriorated concrete surface measured 14-1/2 inches through an 18 inch slab section. Dam inspector is seen pointing at exposed reinforcing bar. Other picture shows extent of deterioration in area immediately below picture with dam inspector.



6. Additional pictures of deteriorated spillway concrete section.

7. Spillway abutment wall on east side of river. Concrete is severely eroded.



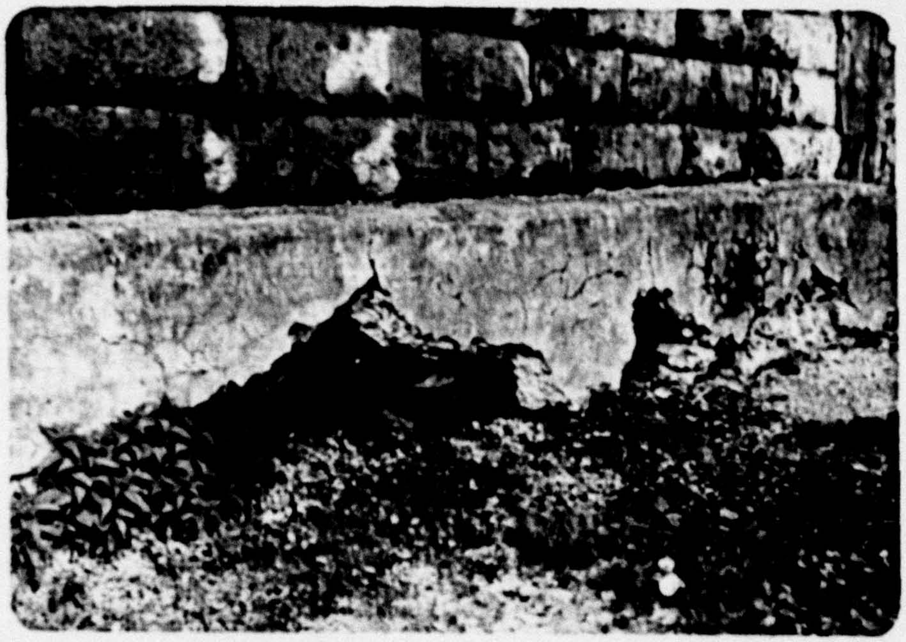


8. Spillway sections are vented below spillway apron between each buttress. An access panel is also described in the plans through each buttress. There is no access into the area below the spillway slab. Discharges were evident through a number of the vents for a period of time after the pool was lowered below crest, indicating probably through dam seepage.

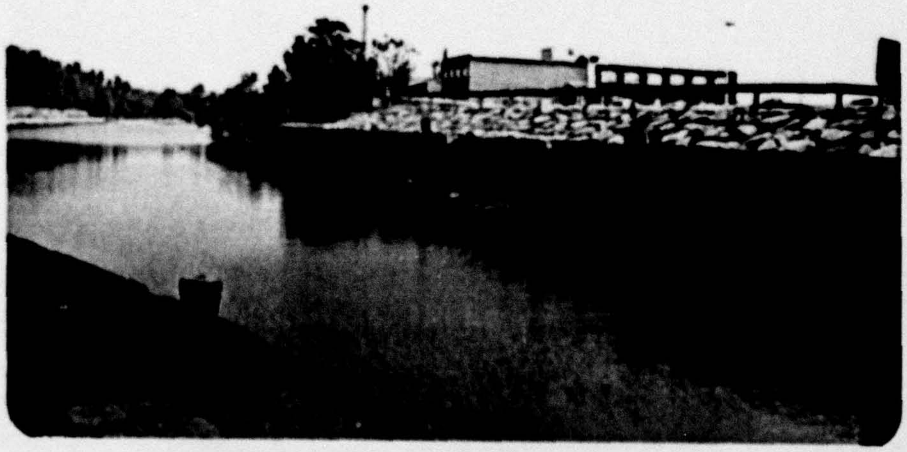
9. Riverside wall of lock shows seepage and advanced concrete surface deterioration.

10. Tooth of pinion gear of sluice gate on east side of river used to regulate flow into powerhouse.

11. Deterioration of downstream walls of lock.



12. Undermining of Oneida Street Bridge pier adjacent to downstream gate of lock.



13. Deteriorated canal wall adjacent to downtown shopping area parking lot.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - LOWER FULTON DAM - LOCK NO. 3 ID# - NY 406

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Lower Fulton Dam - Lock Number 3 and appurtenant structures, owned by the New York State Department of Transportation, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Lower Fulton Dam at Lock Number 3, a 500 foot long crested spillway, is constructed as a composite masonry and concrete structure approximately 19 feet high. Lock Number 3 of the Oswego canal is situated on the east bank of the river. Immediately to the west of the lock there is located a small power generating station, owned by the Niagara Mohawk Power Corporation. This facility is presently undergoing renovation and will be placed in operation upon completion of the work. The west end of the power generating station forms the east abutment of the main dam. On the west bank of the river forming the west abutment of the dam is a sluice gate structure which controls flow into the forebay of the Granby Power Generating Station owned by Niagara Mohawk Power Corporation. This power generating

station is presently in operation. The combination of lock, power generating station, dam and an additional power generating station on the west bank spans the entire width of the Oswego River. The dam is the third in a series of six dams which regulate flow in the Oswego River for use in navigation and power generation.

b. Location

The Lower Fulton Dam at Lock Number 3 is located in the City of Fulton, Oswego County, New York.

c. Size Classification

The maximum height of the dam is approximately 19 feet. The storage volume in the impoundment is approximately 650 acre feet. Therefore, the dam is in the Small Size Classification as defined by The Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The Oswego River flows through the City of Fulton. The Oswego River is also used for navigational purposes, therefore, the dam is in the High Hazard Category as defined by The Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the New York State Department of Transportation.

Waterway Maintenance Subdivision:

New York State - DOT
Main Office - State Campus
1220 Washington Avenue
Albany, New York 12232
Director - Mr. Joseph Stellato
(518) 457-4420

Region Three:

New York State - DOT
Syracuse State Office
333 E. Washington Street
Syracuse, New York 13202
Engineer - Mr. Leo Burns
(315) 473-8194

f. Purpose of the Dam

The dam is used to regulate flows in the Oswego River for navigational use and power generation. The Oswego River is also used for recreational purposes.

g. Design and Construction History

The dam, as it now exists, was constructed in approximately the year 1914. At that time a concrete buttress overlay was constructed over an existing masonry dam. The date of the original masonry dam construction is unknown.

h. Normal Operational Procedures

The facility is operated by the New York State Department of Transportation in cooperation with the Niagara Mohawk Power Corporation. The main function of the facility is to provide adequate pool elevations for navigation in the Oswego Canal. The secondary function of the facility is for power generation at the Niagara Mohawk Power Generating Facilities. In order to fulfill the primary function of the facility, navigation, it is necessary to maintain the upstream water level at the elevation of the spillway crest. In order to maintain this level and have adequate flows for power generation, the Niagara Mohawk Power Corporation places flashboards on the dam each spring to provide sufficient impounded water during the low run-off periods. The gates which control the flow into the forebay of the power generating stations are owned and operated by the New York State Department of Transportation. These gates may be closed to shut off flow to the generating facilities. Representatives of the New York State Department of Transportation indicate that it has been unnecessary to manipulate these gates in order to regulate the generating flow. The gates are used only to dewater the forebay channel for maintenance purposes.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of Lower Fulton Dam - Lock 3 is 5100+ square miles.

b. Discharge at Dam Site

Peak discharges recorded at USGS gage 0424900, 10.6 downstream at Lock Number 7.

28 Mar 1936	37,900 cfs
10 Apr 1940	35,000 cfs
27 Jun 1972	32,300 cfs

For other values of annual peaks, see Appendix C.

Computed discharges:

Ungated spillway, top of dam	35,000	cfs
Ungated spillway, design flood	30,000	cfs
PMF	81,900	cfs
1/2 PMF	46,800	cfs
Maximum Navigation Pool	35,000	cfs
Gated drawdown, thru Niagara Mohawk Power Plant	7,400	cfs

c. Elevation* (Barge Canal Datum USGS +0.99 ft.)

Top of Dam	342.6
Maximum Pool - Design Discharge	341.6
PMF	347.5
1/2 PMF	344.0
Spillway Crest Nav. Season w/flashboards	335.5
Winter Season w/o flashboards	334.75
Stream Bed at Centerline of Dam	317.±

d. Reservoir (Up to Lock 2 at Upper Fulton)

Length of maximum pool	3300 ft
Length of normal pool	3300 ft

e. Reservoir Area

Top of dam	50± acres
Spillway pool	50± acres

f. Dam

Type - Masonry rubble with concrete crested spillway overlay with buttress and slab system.
Length - 500 feet
Height - 24 feet
Freeboard between normal reservoir and top of dam - 7 feet
Top width - See plans for crest dimensions
Side slopes - Upstream: 3 vertical/1 horizontal

g. Spillway

Type - Crested spillway
Length - 400 feet
Crest elevation - 335.5 navigation season
Gates - Gates control flow to hydropower facility

*Stages for flood flow conditions assume failure of flashboards under these high heads.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The information available for evaluation of this dam has been included in this report. The information consisting of contract drawings is contained in the enclosed Figures 2 through 6. No information on design of the dam was available.

2.2 CONSTRUCTION

Details regarding the construction of this facility are included in Figures 2 through 6 along with previous inspection reports on the dam by New York State Department of Transportation and New York State Department of Environmental Conservation. Modifications and major maintenance activities by the Department of Transportation are also included through 1967. The last recorded New York State Department of Environmental Conservation inspection was dated in 1915.

2.3 OPERATION

No Operating Manual is known to exist for this structure.

2.4 EVALUATION

The engineering data included in this report is adequate to complete this Phase 1 investigation. Therefore, no additional requirement for data is given at this time.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The Lower Fulton Dam at Lock Number 3 was inspected on June 7, 1979 and again on June 13, 1979. The Dale Engineering Company Inspection Team was accompanied on the inspection by Richard Aldrich of the New York State Department of Transportation, Region 3, and Robert McCarty of the New York State Department of Environmental Conservation, Dam Safety Section. The team was accompanied on the second inspection by Robert Levett, Niagara Mohawk Power Corporation and John Brennan, Niagara Mohawk Power Corporation.

b. Dam

The first inspection was conducted with substantial flow occurring across the spillway. During this inspection the water surface along the downstream spillway face showed evidence of surface deterioration. Subsequently, another inspection was scheduled with the impoundment drawn down so that the face of the concrete spillway could be inspected. The photographs show the heavily deteriorated surface of the concrete spillway. In some areas deterioration has occurred to a depth of 14-1/2 inches in slabs having a total depth of 18 inches. Both the east and the west abutment walls of the spillway were found to be in severely eroded conditon. The area below the concrete slab which spans between the buttresses forming the spillway section are vented through 12 inch square holes at the toe of the apron. Flow through these vent holes indicate that seepage may be occurring through the dam.

c. Appurtenant Structures

The concrete surfaces on the lock walls show signs of seepage and advanced concrete surface deterioration. The concrete is in generally poor condition due to its advanced age. The canal wall which forms the east bank of the stream just below Lock Number 3 is in a severely deteriorated condition.

The sluice gates which control flow into the forebays of the two power generating stations are all in operating condition as evidenced by the fact that the gates to the small station adjacent to the lock are presently closed and maintenance is being performed in the turbines. The gates controlling the entrance to the Granby Power Generating System were manipulated by the inspection crew at the time of the inspection. However, some maintenance is required on a few of the mechanical operating devices. Teeth were missing in one of the pinion gears which operated the gates.

d. Control Outlet

Outlet from the impounded area is controlled by regulating the flow through the power generating station and by the placement of flash-boards on the dam. Drawdown of the impoundment for the second inspection was accomplished increasing flow through the power generating station. The power generating station is presently in use by Niagara Mohawk Power Corporation.

f. Reservoir Area

The reservoir area extends approximately 3300 feet upstream to another run of river dam which performs a function similar to this facility. There are no known areas of bank instability along this course.

g. Downstream Channel

The downstream channel is formed in bedrock and is in generally good condition. No evidence of recent erosion was noted.

3.2 EVALUATION

The visual inspection reveals generally poor concrete surface conditions throughout the facility. This deterioration of concrete is most pronounced on the spillway of the main dam and on both abutments. No major deformation in the alignment of the structure was noted in the visual inspection. The spillway and control structures are in operating condition although somewhat poorly maintained.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The primary operational procedure is to control water level in the impoundment upstream from the dam for navigational purposes on the Oswego River. A secondary operational procedure is the utilization of excess water for power generating purposes. Total operational procedure is under the control of the New York State Department of Transportation. The operation is done in cooperation with Niagara Mohawk Power Corporation. Water level control through the use of hydro turbines is done in cooperation with Niagara Mohawk Power Corporation.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the New York State Department of Transportation. The flashboards are put in place by Niagara Mohawk Power Corporation. Each year a visual inspection is made of the structure by a New York State Department of Transportation inspector and a report on the condition of the structure is filed at the Department of Transportation Central Office in Albany. Maintenance to the structure is scheduled on a priority basis partly as a result of the annual inspection. Major maintenance items, such as the deteriorated spillway surface condition, have not been performed.

4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the entrance to the forebay of the power generating station are under the control of the New York State Department of Transportation. These gates are operated infrequently and are used mostly to accommodate Niagara Mohawk when dewatering of the forebay is required.

4.4 DESCRIPTION OF WARNING SYSTEMS

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenant structures are inspected at regular intervals by the New York State Department of Transportation. Maintenance on the control gates to the forebay of Niagara Mohawk Power Station has been infrequent, however, these facilities are in operating condition. The deteriorated condition of concrete indicates that past maintenance has not been adequate. The Department of Transportation has indicated it plans to perform major maintenance repairs to the Oswego River structures in the near future.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Oswego River Basin located in central New York State, has a drainage area of approximately 5,100 square miles. It flows northerly discharging into Lake Ontario in the City of Oswego. The complex river system includes the seven Finger Lakes, Oneida Lake, Onondaga Lake, the Barge Canal and outlets from the lakes to the canal. The basin's major rivers, the Seneca, Oswego and Oneida, are incorporated into the Barge Canal System as are Oneida, Cayuga and Seneca Lake. All of the lakes have regulated outlets excepting Onondaga.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. Where the structure is integrated with hydropower and navigation lock facilities, interrelationships from a hydrologic standpoint have been evaluated. In general, in this screening analysis, control structures and gates used for the latter two purposes are not considered as flood control devices.

Different scenarios of partial dam failures, i.e., tainter gates or monolith failures, are beyond the scope of this analysis due to the fact that the dam is a run of river facility and the downstream dam break flood wave analysis is multi-dimensional. From a commentary viewpoint, the dam inspection team concludes that a partial failure under normal conditions would potentially be a navigational hazard rather than an inundation hazard.

The dam's stability and flood discharge capacity is assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration run-off of a specific location that is considered reasonably possible for a particular drainage area. Since this dam is in the Small Dam Category and is a High Hazard, the guidelines criteria (Ref. 1) require that the dam be capable of passing one-half the Probable Maximum Flood.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience and existing data were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF.

An HEC-1 computer model for the basin was obtained from the New York State Department of Environmental Conservation. This model has been developed over the years through a number of study efforts by the Department with assistance from the U.S. Army Corps of Engineers, Buf-

falo District. The model was calibrated by D.E.C. to a peak flood event, Hurricane Agnes, June 20-26, 1972. The dam investigation team briefly reviewed these findings. It then obtained the flood records at USGS gage at Lock 7 near the dam sites, and within the constraints of this scope of work, verification of the existing model was obtained (See Figure C-8). The sub-basin designation, 6-hour unit hydrographs, routing methods, and loss rates for the model (those used for Hurricane Agnes) were all adopted. The model was recorded for the HEC-1DB PMF analysis. In reviewing the regulated outlet rating curves, it was determined the high discharges for this PMF analysis were not adequately described. However, these flows were accounted for by increasing the Modified Puls Method rating curves for these outlets (See Appendix C). In one instance, a rating curve developed for one of these outlets and used by the inspection team on a previous inspection report was substituted into the model.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB was utilized to evaluate the PMF hydrology. The Probable Maximum Precipitation (PMP) was 21.5 inches, Hydrometeorological Report (HMR #51) for a 24-hour duration, 200 square mile basin. Loss rates used from the D.E.C. model were in the range of 1.0 inches initial abstraction and 0.1 inches/hour continuous loss rate. Actual values used were those calibrated during the storm of Hurricane Agnes, June 20-26, 1972. Only one multi-plan analysis (.2, .4, .5, .6, .8, 1.0 PMP) was performed. It distributed the rainfall over the 5,100 square mile area. If further in depth investigations are undertaken, they should attempt to center the storm for critical flows since the major sub-basins lend themselves to such an analysis and a potential for greater run-off. This work effort would be a refinement of the analysis provided herein.

This dam investigation at Lock No. 3 is one of six dam investigations on the Oswego River. These dams are located at Locks 1,2,3,5,6, and 7. The hydrologic analysis provides flood flows up to Lock 1 at Phoenix, New York (Lock 7 is near the mouth of the river at Oswego). It assumes the discharges from the 6-hour time increment PMF hydrographs will effectively be the same for all the dam sites since the upstream run-off area is over 5,000 square miles and the downstream run-off area is about 100 square miles. The results of the analysis have been compared to the USGS gage discharge-frequency plot results at Lock 7 (See Figure 8).

5.3 SPILLWAY CAPACITY

The spillway is a crested spillway which reaches across the effective width of the river. The dam is a combination buttress and concrete gravity dam and has an effective crest length of 509 feet. The channel spillway crest shape design head was estimated from the geometry of the section at 8.00 feet. Subsequently, discharge coefficients were computed in the range of 3.30 to 4.23.

Submergence was checked and found not to be effective up through the PMF. At the top of dam elevation, the overflow spillway capacity was computed at 35,000 cfs. Certain plans for these six dams, some of which were constructed under a single contract, call out the original design flood as 30,000 cfs. The gage at Lock 7 has recorded two events greater or equal in magnitude with the spillway top of dam capacity. The PMF was computed at 81,900 cfs while the 1/2 PMF flood was computed at 46,800 cfs.

SPILLWAY CAPACITY

		Without Flashboards
	Discharge	Capacity as % of Discharge
PMF	81,900	43%
1/2 PMF	46,800	75%

5.4 RESERVOIR CAPACITY

The reservoir storage at top of dam is estimated at approximately 650 acre feet. Lock 6, Upper Oswego Dam (High Dam), is located approximately 1/2 mile upstream.

5.5 FLOOD OF RECORD

Floods have been measured at USGS gaging station 04249000 at Lock 7. The gage datum is 246.0 ft.; the drainage area of the gage is 5121 sq. mi.; the period of record is from 1934 to present. The records through 1974 show that 4 events have had flood discharges in excess of the dam's original design flood. Two events were greater than or equal to existing top of dam discharge capacity.

March 28, 1936	37,500 cfs
April 10, 1940	35,000 cfs
June 27, 1972	34,300 cfs
April 4, 1960	31,200 cfs

A Corps of Engineers' investigation entitled Post Hurricane Agnes (June 20-26, 1972) Investigation indicates only $14,000 in damages occurred in the reach from Lock 1 through Lock 7 to Lake Ontario.

5.6 OVERTOPPING ANALYSIS

The HEC1-DB analysis indicates that the dam would be overtopped as follows:

	OVERTOPPING IN FEET
PMF	5.0
1/2 PMF	1.5

According to this analysis, the dam may have been overtopped in the past since the top of dam discharge capacity is around 35,000 cfs. It would be overtopped with a 1/2 PMF.

5.7 EVALUATION

The spillway is inadequate to pass the 1/2 Probable Maximum Flood without overtopping the dam. However, based on the Corps of Engineers' Screening Criteria, it is not considered seriously inadequate, since the spillway is stable under the 1/2 PMF conditions. This assessment is made providing the Owner verifies that uplift forces beneath the spillway slab affect only the plan area of the rubble dam and the buttresses. If uplift forces between the buttresses exist because of the location of a continuous slab, then remedial action should be taken according the the Corps of Engineers' Criteria for a seriously inadequate spillway condition as to be directed by the New York State Department of Environmental Conservation.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations And Data Review

The main dam structure was observed when the upstream water level had been drawn down below the spillway flashboards making the dam's downstream face accessible for inspection. The upstream side of the dam was submerged.

Observations indicate the dam structure retains stability at this time with no indication of misalignment, displacement or other structural movement. Design drawings indicate this is a buttressed structure with an upstream stone rubble dam section being braced by concrete buttresses on the downstream side. The top of the rubble section and buttresses have been covered with a continuous concrete slab to create a crest shape. Under normal operation, this main dam functions as a crested spillway.

The concrete downstream face of the dam (buttress slab cover) has experienced varying degrees of deterioration and spalling, some significant. Field observations indicate water leaks into the buttress zones of the dam structure, but it could not be ascertained if the seepage entry is primarily through the upstream dam section and/or the downstream slab. The noted condition of the slab makes it highly probable that a significant volume of water does enter through deteriorated slab sections and joints. However, through-the-dam flow was observed at two locations through the vents along the apron while the upstream pool was drawn below the flashboards.

A concrete wall serves as the westerly abutment of the dam and the separation wall for the forebay of the power station situated on the west side of the river. The dam side of this abutment wall is deteriorated and eroded from the effects of spillway flow. The downstream wall of the forebay has deteriorated areas and leakage occurring. No indication of structural instability was noted, however, concrete in the dam's east abutment wall is severely eroded.

An inoperative power station is located adjacent to the east limits of the dam. The water intake gates for this facility are closed, but the concrete in the gate structure is deteriorating and leakage occurs.

Concrete and masonry walls of the navigation lock extending along the east side of the dam have experienced varying degrees of deterioration, along with undermining. No indication of structural instability was noted. On a similar note, deterioration and undermining of the concrete pier for the street bridge adjacent to the downstream lock gate was noted.

b. Geology and Seismic Stability

This Dam, in the Oswego River drainage basin, is located within the Ontario Lowland which is part of the Central Lowland Province. According to the 1915 Dam Report, the dam was sited on solid rock. Outcrops observed in the vicinity of the dam vary from thinly bedded cross-beds of reddish, very-fine to medium-grained sandstones to medium-bedded, grayish, medium-grained calcareous sandstone. Apparently two rock units are present: the reddish cross-bedded sandstones are of the Grimsby Sandstone of Lower Silurian age and are overlain by the grayish calcareous Kodak Sandstone of Middle Silurian age. Dip of the units is less than 1° to the south.

None of the original plans or inspection reports available indicate that the bedrock had been grouted prior to construction. If not grouted, the strongly jointed bedrock, friable in the thin red beds and calcareous in places, would over a period of time become weakened and separate easily along bedding and joint planes. Due to the ferruginous and calcareous cement of the sandstones, the bedrock is susceptible to deterioration by weathering and leaching; properly grouted and sealed bedrock could be rated as having a good bearing capacity.

Bedrock is well-jointed with several sets prominent; orientations, all with near vertical dips, are N60-65E, N15E, N15-20W, N35W, N50W, and N65W. Orientation of the dam crest is N70E. Thus the two major joint sets, N60-65E and N15-20W, are close to parallel and perpendicular to the dam face. Undercutting of the beds and leaching of the rock cement could lead to easy removal of blocks of rock in front of the dam face. If not grouted, additional undercutting of the spillway apron is feasible. No firm recommendation for grouting is implied, however, future repair work may give it consideration.

There are no known faults or shear zones in the vicinity of the dam according to the N.Y.S. Geologic Map (1970). The Preliminary Brittle Structures Map of the N.Y.S. Geologic Survey (1977) indicates a possible fault zone based on drill hole data located about 8 miles north of the dam.

The dam is located in an area having a Zone 2 Designation on the Seismic Probability Map. No earthquake activity has been recorded in the vicinity of the dam. The closest earthquake, as well as the largest (intensity IV, modified Mercalli scale), occurred in 1954 about 25 miles southwest of the dam. Several other minor earthquakes have occurred in the region, none closer nor more recent than that of 1954.

c. Stability Evaluation

Design drawings available for review show plan layout and cross-sections for the various structural elements comprising the dam-lock facility, but do not include information on the properties of the dam

and foundation materials, nor stability analysis. As part of the present study, stability evaluations have been performed for the dam/spillway sections. Actual properties of the dam's construction materials and foundations were not determined as part of this study; where information on properties were necessary for computations but lacking assumptions felt to be practical were made. These stability computations assumed a dam cross-section based on dimensions indicated by the plans included in this report. For the cross-section, two cases were considered because of lack of clarity on the available plans: the dam structure consists of the rubble section and buttresses or, the dam structure consists of the rubble section, buttresses, plus a ground level structural slab between buttresses. The analysis also assumed the dam section to be a monolith possessing necessary internal resistance to shear and bending occurring as a result of loading. It should be considered that in areas where deterioration has occurred, the section dimensions would be less than indicated by the plans with some adverse effect on the dam's structural strength expected.

The results of the stability computations are summarized in the table below. The stability analyses are included in Appendix D.

RESULTS OF STABILITY COMPUTATIONS

	Loading Condition	Factor of Safety* Overturning	Factor of Safety* Sliding**	Location of Resultant*** Passing through Base
(I)	Water elevations at normal operating levels, uplift acting on base plus 7.5 kip per lineal foot, ice load acting:			
(i)	uplift on plan area of rubble dam and buttresses only	1.65	9.2±	0.46b
(ii)	uplift on total dam plan area (rubble section, buttresses, slab area between buttresses)	1.39	---	0.66b
(II)	Water elevations at 1/2 PMF levels, uplift acting on base as computed for normal operating conditions:			
(i)	uplift on plan area of rubble dam and buttresses only	1.57	8±	0.35b
(ii)	uplift on total dam area (rubble section, buttresses, slab area between buttresses)	1.32	---	0.48b
(III)	Water elevation at PMF levels, uplift acting on base as computed for normal operating conditions:			
(i)	uplift on plan area of rubble dam and buttresses only	1.58	7±	0.33b
(ii)	uplift on total dam area (rubble section, buttresses, slab area between buttresses)	1.34	---	0.29b

*These factors of safety indicate the ratio of moments causing overturning to those moments resisting, and the ratio of forces causing sliding to those resisting.

**As determined applying the friction-shear method.

***Indicated in terms of the dam's base dimension, b, measured from the toe of the dam.

The analysis indicate the dam is stable under normal operating conditions, the 1/2 PMF and the PMF condition if the dam structure consists of the rubble section plus buttresses, as is felt most probable. Unsatisfactory stability is indicated for the dam subject to forces possible during normal operations and the PMF condition, according to Corps of Engineers' evaluation criteria if the dam monolith includes a structural slab foundation for buttresses as well as the buttresses and rubble section.

Critical to the analysis and resulting indication of stability are the items of uplift water pressures acting on the base of the dam and the relative permeabilities of the site's foundation rock. For the "normal operating conditions" case, the analysis uplift force was based on a full headwater hydrostatic pressure acting on the dam's upstream corner and a zero tailwater hydrostatic pressure acting at the dam's downstream corner. Uplift pressures were assumed to vary linearly between the dam's upstream and downstream corners, and act upon 100 percent of the dam base. The resulting uplift force represents a condition that is significant in arriving at the computed factor of safety against overturning.

Uplift, as computed for the normal operating condition, was also assigned for the flood conditions studied, it being assumed that uplift pressures would not increase significantly over a relatively short flood stage time period, because of expected low foundation rock permeability.

Further investigation is recommended to determine conditions within the dam between buttress locations behind the rubble wall section, to ascertain the structural integrity of the rubble wall and concrete buttresses, to establish the presence or absence of a structural slab foundation for the buttresses, and to detect seepage and uplift occurrences. This investigation should extend to inspection of the area downstream of the dam under drawn down conditions to detect signs of underdam seepage.

Repair of deteriorated concrete should be accomplished for the dam spillway slab and abutment walls to prevent progressive deterioration and possible adverse structural effects.

Locations of under-dam seepage noted in future investigative and repair periods should be sealed.

Repair of deteriorated concrete in the navigation lock structure also should be undertaken.

Information about noted deteriorations and seepage in the power station structures on the west and east sides of the dam should be relayed to officials of the Niagara Mohawk Power Corporation, to enable them to undertake corrective measures.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

This Phase I inspection of Lower Fulton Dam at Lock 3 did not indicate conditions which constitute an immediate hazard to human life or property. However, the dam's spillway surface is very deteriorated and could develop into a hazardous condition at some time in the near future. The dam would be overtopped by 1/2 PMF flood, but can safely discharge 43 percent of the PMF. Additional structural investigations are warranted to determine the spillway base conditions so that the Corps of Engineers' Screening Criteria in regard to stability can be assessed. An issue is the determination of the effective base area of the spillway on which uplift pressure occurs. Through-the-dam seepage is also suspected and a more thorough investigation of the dam including the hollow interior portion is needed.

If uplift pressure is only under part of the spillway as believed to be the most likely case, then the spillway is not considered seriously inadequate, based on the Corps of Engineers' Screening Criteria, since the spillway has been determined to be stable under the 1/2 PMF.

The following additional and/or specific safety assessments are based on the Phase I visual examination, analysis of hydrology and hydraulics, and structural stability:

1. The dam's concrete spillway is a composite masonry and concrete structure consisting of the old overflow masonry dam capped with a crest shaped concrete overlay. The downstream spillway is a slab system supported by the old dam and concrete buttresses located 15 feet on center (see Sketch in Appendix D). The slab system of the spillway is severely deteriorated and eroded across the entire width of the dam. In some areas deterioration has occurred to a depth of 14-1/2 inches in slabs which have a total depth of 18 inches. In one location a reinforcing bar is partially exposed. Deterioration is most prevalent along construction joints over the buttresses.

2. After the spillway was drawn down below the flashboards, continued flow was observed from a number of the slab system vents, indicating through-the-dam seepage. This is most likely through the masonry dam which forms the submerged upstream face of the dam.

3. Both abutment walls of the spillway are severely eroded at the waterline.

4. The concrete surface on the lock walls show signs of seepage and advanced concrete surface deterioration. The concrete is in generally poor condition.

5. The mechanical equipment which manipulates the sluice gates is in operating condition. Some teeth were missing in one of the pinion gears which operates the gates.

6. No deformation of the alignment of the structure was noted in the visual inspection.

b. Adequacy of Information

The information available is adequate for this Phase I inspection. Design and construction information is limited to construction plans.

c. Urgency

As previously described, the spillway base area which receives uplift pressure needs to be determined in order to assess the stability of the spillway. In addition, through the dam seepage was observed and needs to be further evaluated. Further investigation of these items should be undertaken immediately and completed within one year from notification. Where this investigation determines that, due to structural instability, a hazard to human life or property exists according to the Corps of Engineers' criteria, repairs should be undertaken immediately. Upon completion of the investigation phase, construction should commence and the remedial work should be completed within two years of notification.

d. Need for Additional Information

As stated above and in the Safety portion of this assessment, additional information and investigation of the spillway area is required.

7.2 RECOMMENDED MEASURES

a. The results of the aforementioned investigations will determine the remedial measures required to obtain adequate dam stability and assessment of through-the-dam seepage. This dam inspection and investigation has identified the following improvement needs:

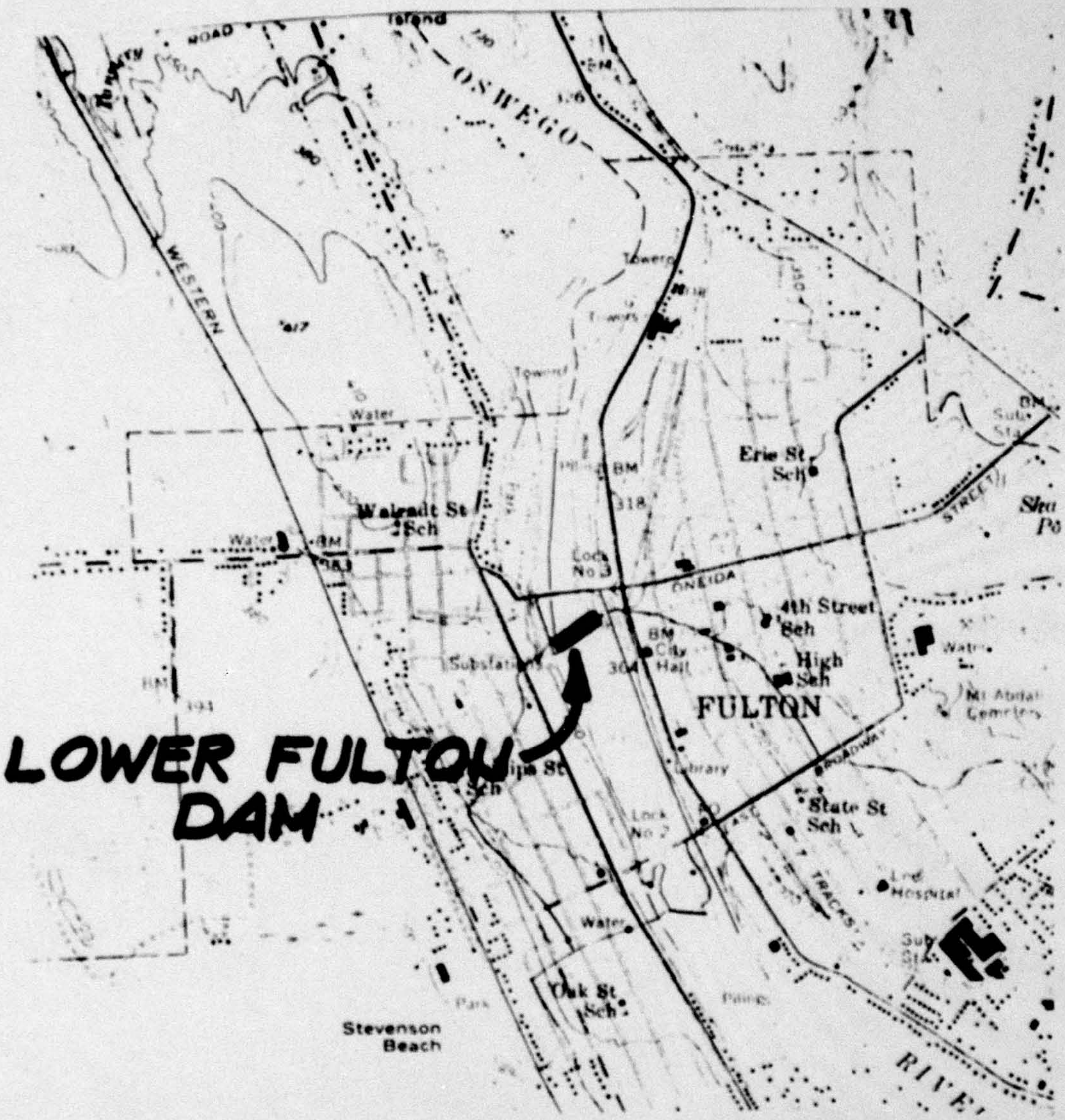
1. Repair the spillway slab and verify the structural integrity of the spillway section.

2. Inspect the interior of the dam to evaluate the condition of the old masonry dam, to refine the stability analysis and to evaluate the severity of through-the-dam seepage.

3. Repair the abutment walls which are severely eroded at the waterline.

4. Repair the mechanical equipment which operates the sluice gates.

5. Investigate and repair the structural integrity of the lock walls, particularly where the walls are attached or adjacent to the spillway or where a hazard potential related to loss of life or property is presented.



VICINITY MAP

LOCATION PLAN

FIGURE 1

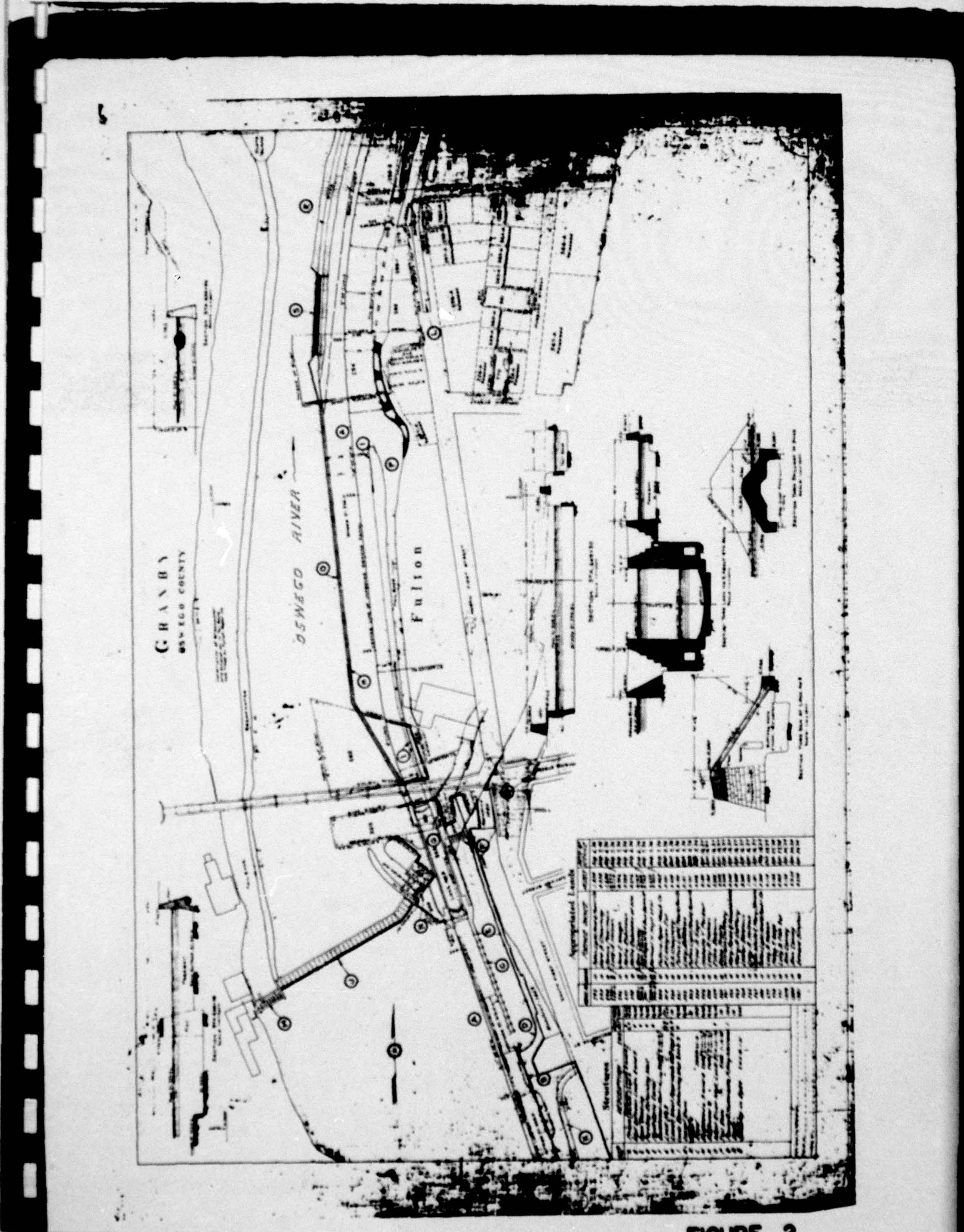

GRANBY
OSWEGO COUNTY
OSWEGO RIVER
Fulton
Appropriated Lands
Structures

FIGURE 2

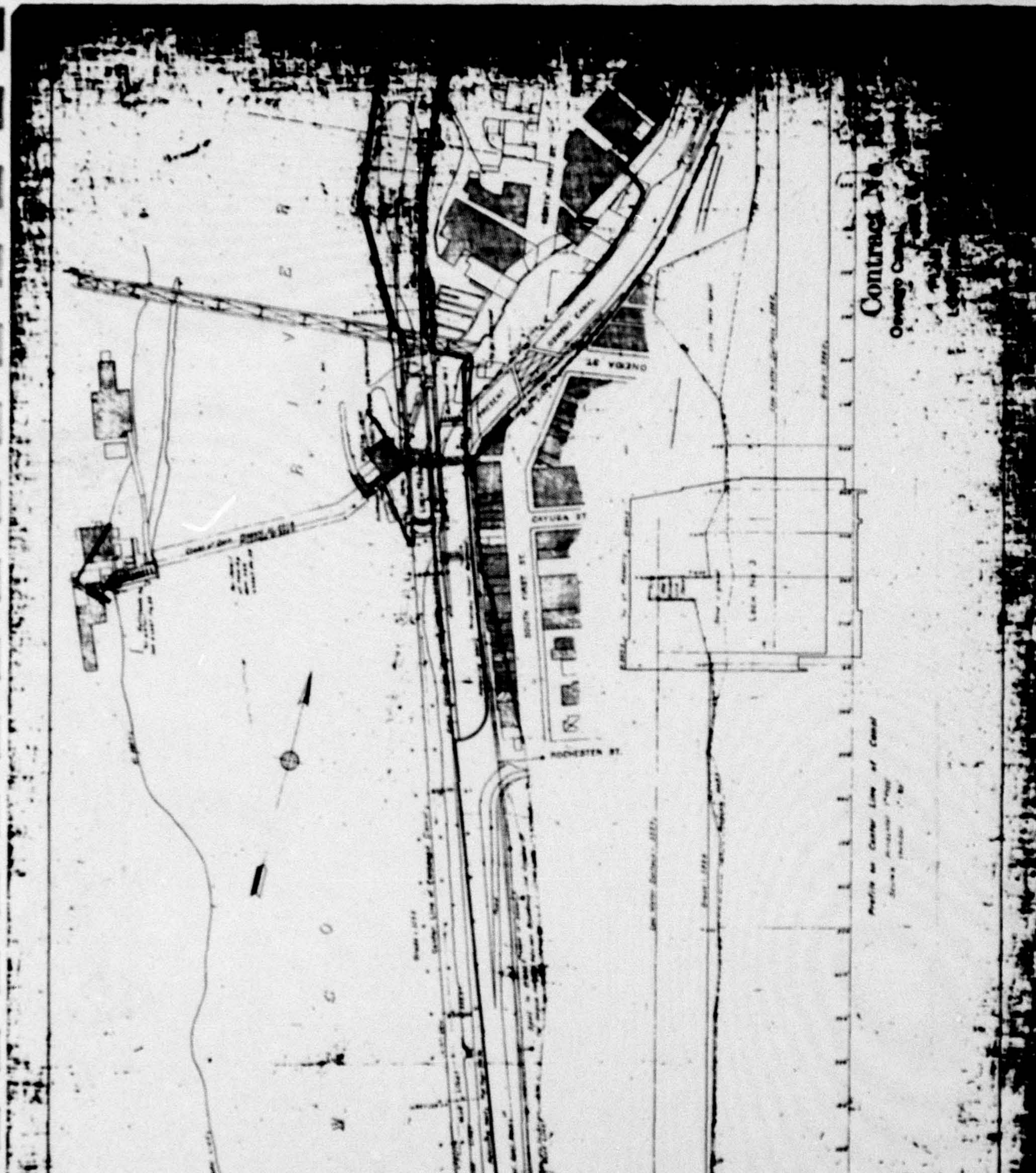

Contract No.
Oswego Canal
ROCHESTER ST.
CAYUGA ST.
Profile on Center Line of Canal

FIGURE 3

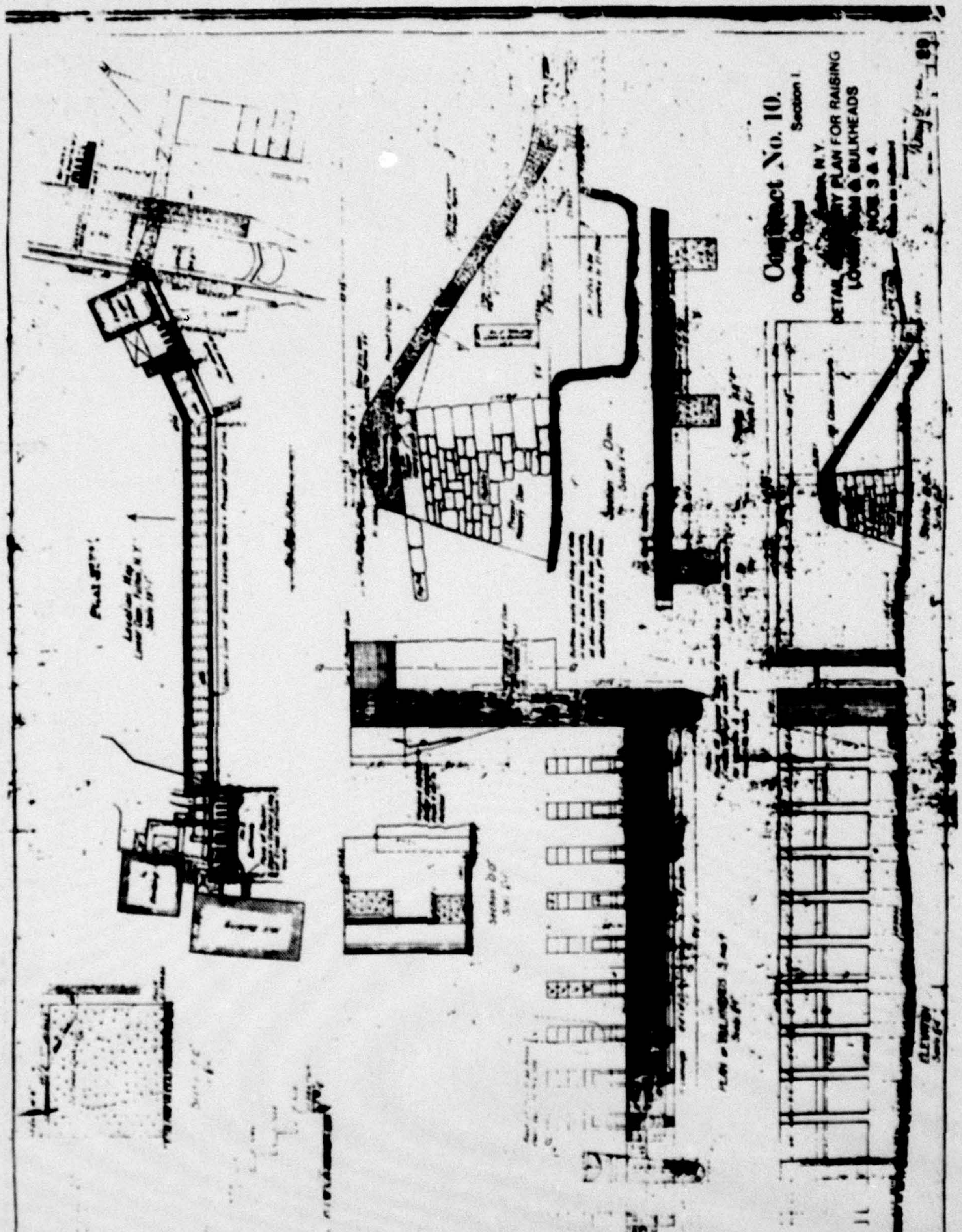

Contract No. 10.
Section I.
N.Y.
PLAN FOR RAISING
BULKHEADS
NOS. 3 & 4.
89

FIGURE 4

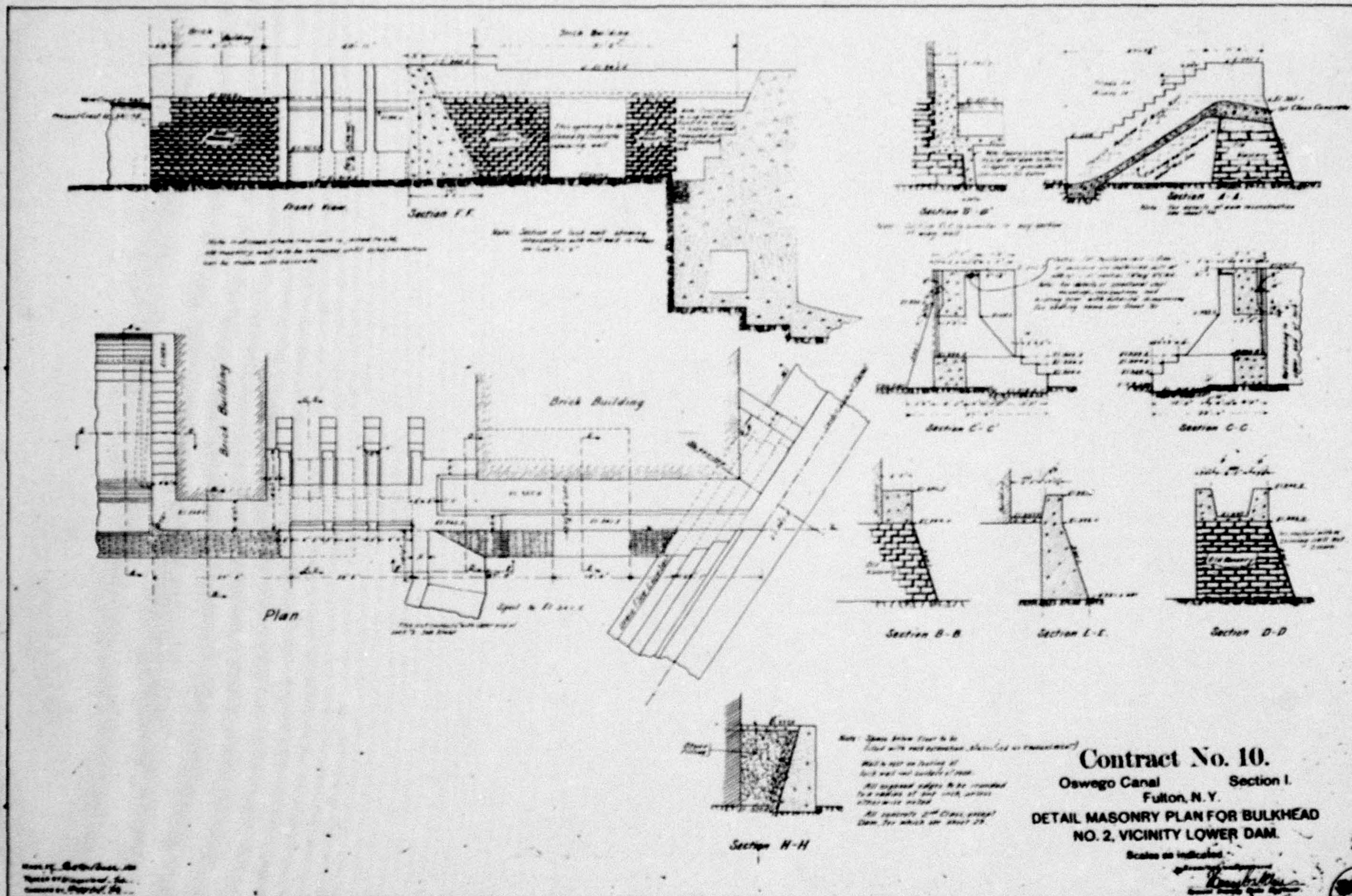

Front View
Section F-F
Brick Building
Plan
Section A-A
Section B'-B'
Section C-C'
Section C-C
Section B-B
Section E-E
Section D-D
Section H-H
Contract No. 10.
Oswego Canal
Section I.
Fulton, N.Y.
DETAIL MASONRY PLAN FOR BULKHEAD
NO. 2, VICINITY LOWER DAM.
Scales as indicated.

FIGURE 5

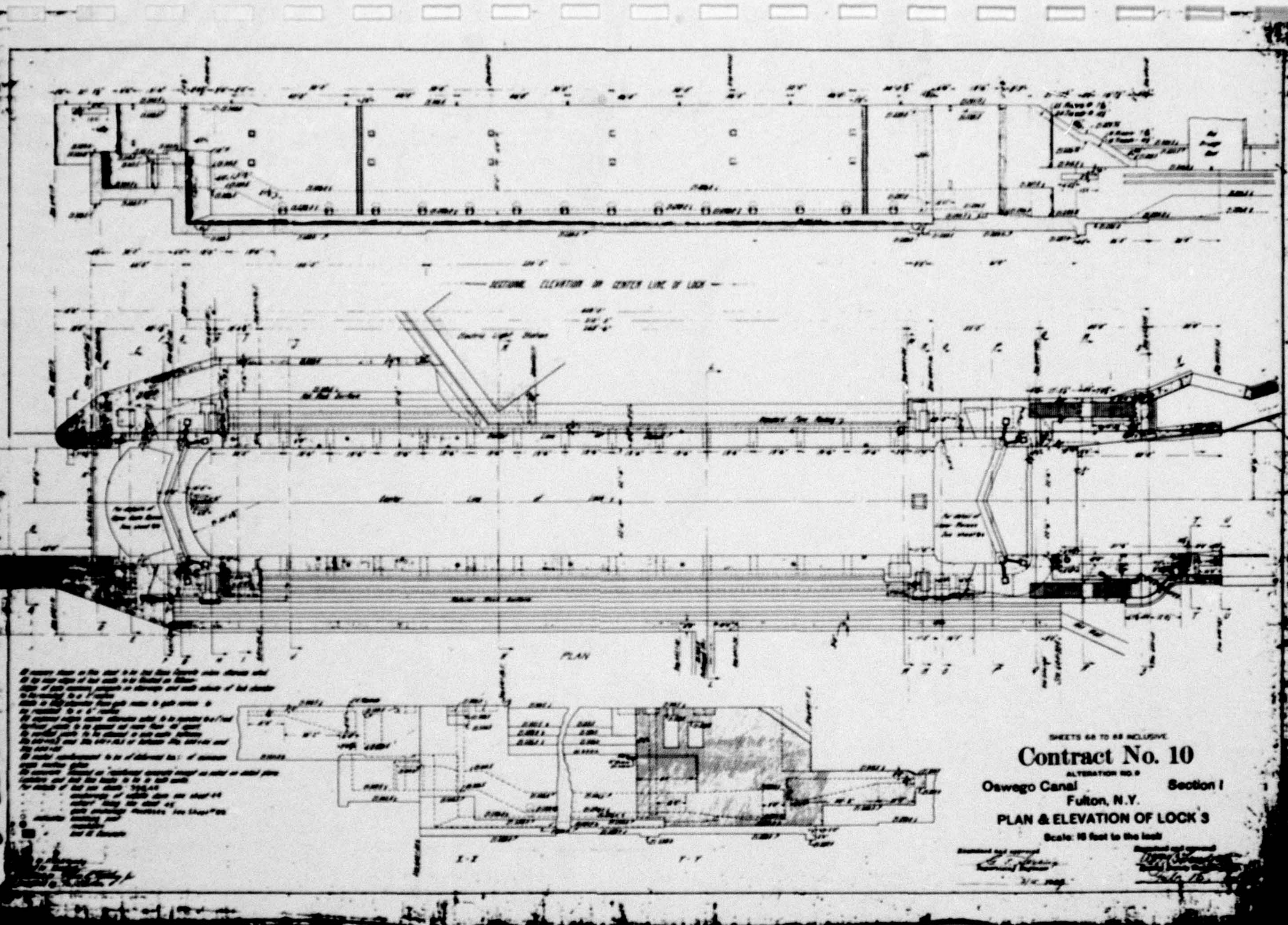
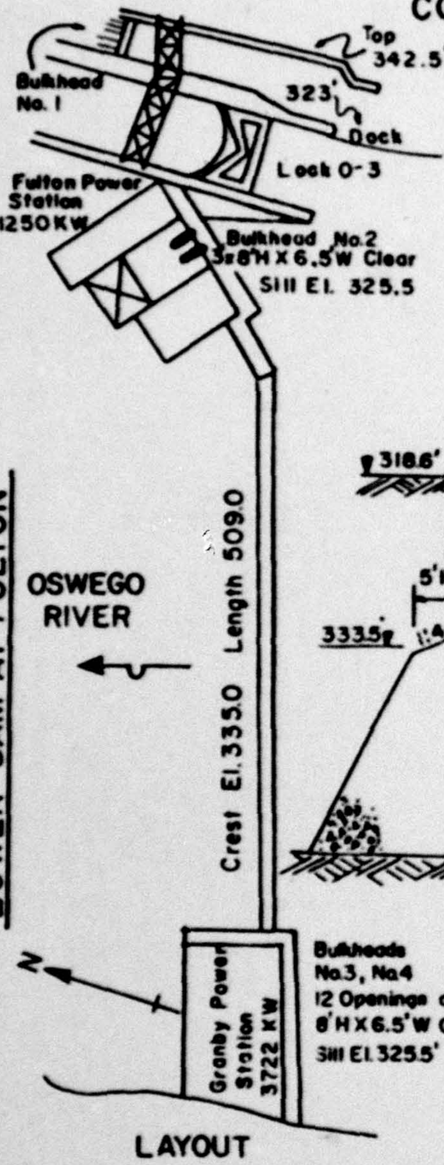
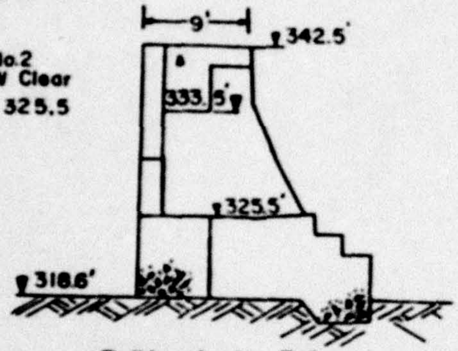

SECTIONAL ELEVATION ON CENTER LINE OF LOCK
PLAN
X-X
Y-Y
SHEETS 68 TO 88 INCLUSIVE
Contract No. 10
Oswego Canal
Section I
Fulton, N.Y.
PLAN & ELEVATION OF LOCK 3
Scale: 16 feet to the inch

FIGURE 6

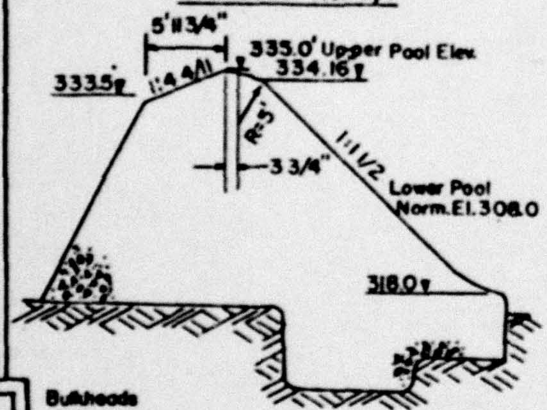
CONTROL STRUCTURE AT LOCK O-3, FULTON



LAYOUT



Bulkheads No. 3,4

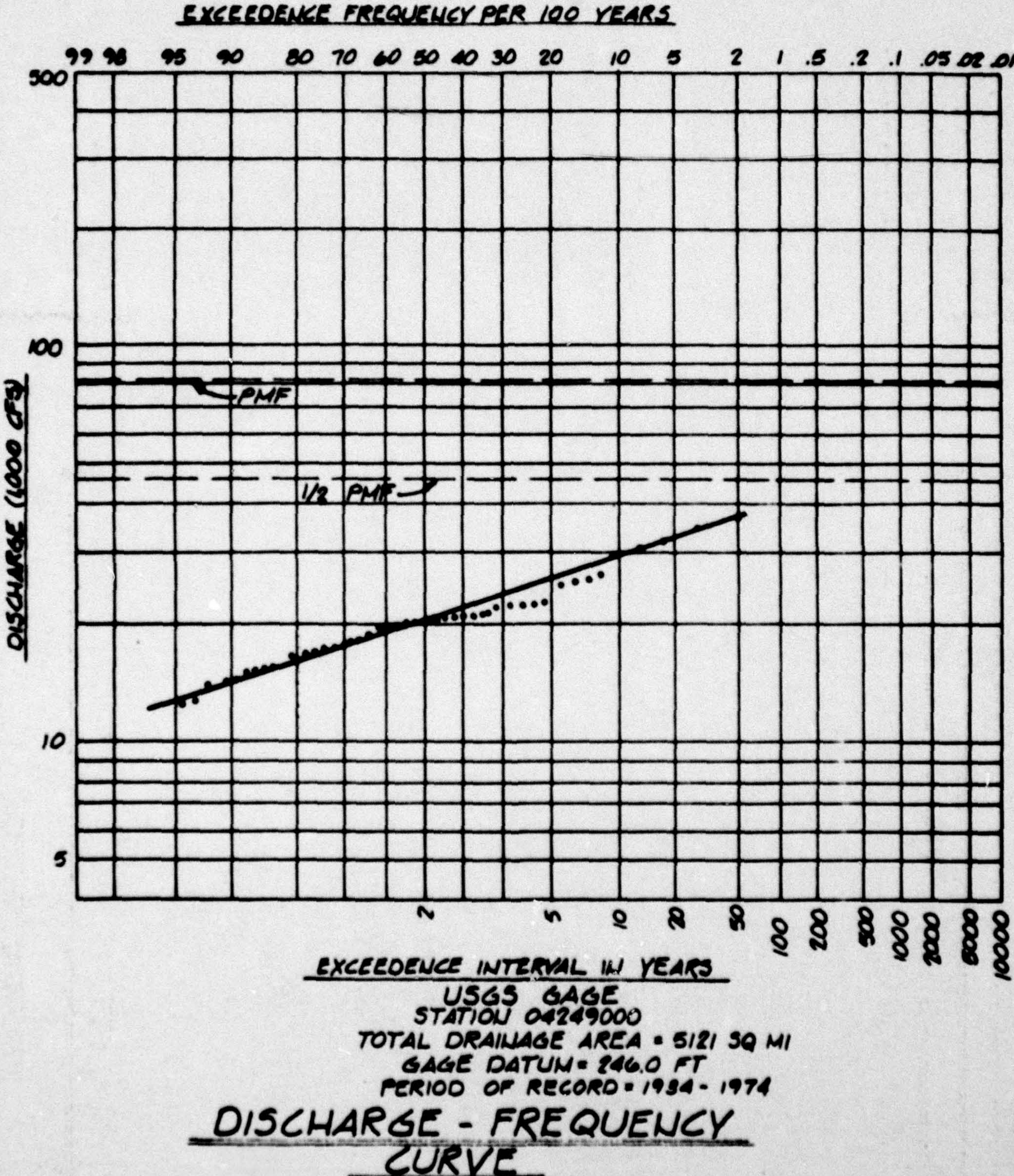


SECTION OF WEIR

LOWER DAM AT FULTON

PLATE V-6 (a)

FIGURE 7



USGS GAGE
STATION 04249000
TOTAL DRAINAGE AREA = 5121 SQ MI
GAGE DATUM = 246.0 FT
PERIOD OF RECORD = 1934 - 1974

DISCHARGE - FREQUENCY CURVE

APPENDIX A

FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam Lower Fulton Dam at Lock 3 (Granby) County Oswego State New York ID # 406

Type of Dam Concrete gravity crested spillway Hazard Category High

Date(s) Inspection (1) June 7, 1979 (2) June 13, 1979 (2 - Below crest) Weather Sunny Temperature 70's

Pool Elevation at Time of Inspection (1) 335.5(+) (2) 335.5(-) M.S.L.* Tailwater at Time of Inspection (1) 316.0 (2) --

Use of Dam: Hydro Power, Navigation Lift: Lock 5 to 3, 18 feet

This inspection does not pertain to an independent evaluation of the condition of the lock or hydropower facility.

Inspection Personnel:

(1),(2) F.W. Byszewski - Stetson-Dale	(1),(2) Richard Aldrich	N.Y.S.D.O.T., Region 3 Office
(1),(2) N.F. Dunlevy - Stetson-Dale	(1),(2) Robert McCarty	N.Y.S.D.E.C., Dam Safety Section
(1),(2) D.F. McCarthy - Stetson-Dale	(2) Robert Levett	Niagara Mohawk Power Corporation
(1),(2) H. Muskatt - Stetson-Dale	(2) John Brennan	Niagara Mohawk Power Corporation
(2) B. Colwell - Stetson Dale		

N.F. Dunlevy Recorder

* Barge Canal Datum (USGS Datum to + 0.99 feet)

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Extensive cracks and erosion of concrete spillway slab surface. Exposed reinforcing bars. Measured depth of erosion is 14 inches plus in 18 inch slab at two locations. Erosion is along entire spillway.	A buttress system supports slab. These are located 15 feet o.c. and are 3 feet thick. Failure would likely occur to slab panels. Condition could lead to partial failure of concrete spillway system.
STRUCTURAL CRACKING	Structural cracking in spillway slab at various locations.	See Comment above.
VERTICAL & HORIZONTAL ALIGNMENT	Alignment of dam is good.	None
MONOLITH JOINTS	Spillway system is composed of slabs supported on concrete buttresses.	None
CONSTRUCTION JOINTS	Joints occur across buttresses and is the first point of deterioration and erosion of surface concrete.	None
STAFF GAGE OF RECORDER	In working order at lock.	None

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	Spillway section - concrete crested spillway overlays old stone masonry dam which was over flow spillway. New crest is slab. Vents are located at toe of of slabs. On east side of dam flow was observed coming from vents long after pool was lowered below crest.	The older dam's structural integrity and seepage problems should be verified. Seepage problems through the stone dam should be investigated and repaired.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Visual observation shows spillway abutment concrete walls severely eroded. Surface of lock walls severely deteriorated and seepage is in evidence.	Deteriorated concrete should be repaired in spillway area. Condition could eventually lead to partial failure of spillway section. Condition of lock is remotely associated as a recreational hazard.
DRAINS	None other than vents described above.	
WATER PASSAGES	None	
FOUNDATION	Foundation appears to be on sandstone bedrock	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N/A	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N/A	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	N/A	
RIPRAP FAILURES	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N/A	
ANY NOTICEABLE SEEPAGE	N/A	
STAFF GAGE AND RECORDER	N/A	
DRAINS	N/A	

UNGATED SPILLWAY

Crested Spillway extends the effective width of the river and constitutes the major section of the dam under head.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	See comments on Sheets 2 and 3.	Concrete weir should be repaired. Replacement of entire spillway slab is likely in order.
APPROACH CHANNEL	Upstream face of dam. Approach channel is effective width of river.	None
DISCHARGE CHANNEL	Effective width of river. Is composed of bedrock. No movement of bedrock or boils located. Sandstone bedrock has some surface erosion and many fractures and joints.	No badly eroded areas threatening to undermine the dam.
BRIDGE AND PIERS	None.	

GATED SPILLWAY

Gates regulate flow to hydro power facility, since navigation has first rights to water during low flow.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	None	
APPROACH CHANNEL	N/A	None
DISCHARGE CHANNEL	N/A	None
BRIDGE AND PIERS	N/A	None
GATES AND OPERATION EQUIPMENT	Manually operated	None

OUTLET WORKS

Only outlets are through power house and lock. Neither of these can completely draw down reservoir pool, however capacity exists to drawdown below crest.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None	
INTAKE STRUCTURE	None	
OUTLET STRUCTURE	None	
OUTLET CHANNEL	None	
EMERGENCY GATE	None	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Channel clear and unobstructed. Bed of channel on rock.	Not a problem.
SLOPES	Channel slope very flat. Overbank condition sloped towards river with development above riverbank.	
APPROXIMATE NO. OF HOMES AND POPULATION	This dam is 6.5 miles above Lock 5. This reach of river has not been inspected to inventory hazards. A cursory examination lists the following: residential, commercial, recreational boats, and docks. Economic loss	Since the dam is located across a navigable waterway heavily used for recreational travel, a high hazard rating is appropriate.
	potential would be in range of $100,00-$1,000,000. Damage to the hydro generating station and lock also possible. Loss of life potential could be more than 4 people either from a flood flow or normal operating	
	situation dam breach. A substantially high loss of life potential is not feasible.	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed.	
OBSERVATION WELLS	None observed.	
WEIRS	None observed.	
PIEZOMETERS	None observed.	
OTHER	None observed.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Little sloped terrain into river and dam pool.	Not a problem area.
SEDIMENTATION	No sedimentation build-up observed.	

NAME OF DAM Lower Fulton at Lock No. 3

ID # 406

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

ITEM	REMARKS
AS-BUILT DRAWINGS	See this report.
REGIONAL VICINITY MAP	See this report.
CONSTRUCTION HISTORY	No data.
TYPICAL SECTIONS OF DAM	See this report.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See this report.
RAINFALL/RESERVOIR RECORDS	Not obtained for this inspection.

ITEM	REMARKS
DESIGN REPORTS	No data.
GEOLOGY REPORTS	No data.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	No data.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	No data.
POST-CONSTRUCTION SURVEYS OF DAM	No data.
BORROW SOURCES	N/A.

ITEM	REMARKS
MONITORING SYSTEMS	Information available at Lock and hydropower generating facility.
MODIFICATIONS	None.
HIGH POOL RECORDS	No data.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	No data. Limited to information on previous inspection reports, see this report.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	No data.
MAINTENANCE OPERATION RECORDS	Same comments as above for monitoring system.

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	See this report.
OPERATING EQUIPMENT PLANS & DETAILS	See this report. More information available from N.Y.S.D.O.T. See card file on maintenance and improvements in this report.

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

Elevations: Barge Canal Datum (USGS + 0.99 feet)

DRAINAGE AREA CHARACTERISTICS: 5100 (±) square miles.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): Nav. Season w/flashboards 335.5
Winter Season w/o flashboards 334.75

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): ----

ELEVATION MAXIMUM DESIGN POOL: ----

ELEVATION TOP DAM: 342.6

CREST:

a. Elevation Nav. Season w/flashboards 335.5
Winter Season w/o flashboards 334.75
b. Type
c. Width See report for crest shape.
d. Length 509
e. Location Spillover
f. Number and Type of Gates

OUTLET WORKS:

a. Type 6,000 cfs Granby side (under design) existing 2900 cfs (to be demolished in 1979)
1,000 cfs Fulton Side.
b. Location Granby-west side of river; Fulton - east side of river
c. Entrance Inverts ----
d. Exit Inverts ----
e. Emergency Draindown Facilities Limited use through power house
Reservoir cannot be completely drawndown. Cannot drawdown through locks without damage to gates.

HYDROMETEOROLOGICAL GATES:

a. Type ----
b. Location ----
c. Records ----

MAXIMUM NON-DAMAGING DISCHARGE: Significant damage 50,000 cfs
Recreational hazard at 0 cfs
or normal operating condition

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE

LOCK NO. 3 FULTON ...-643 Con. U.S. ...
" U.S. 1..
" U.S. 100

Lower Pool 308.00 Upper Mitre Sill 322.0
Upper Pool 33..00 Lower Mitre Sill 295.00
6 x 8 valves

1928 - New gate roller on N.E. Gate
1930 - Anchors for "A" frames installed.
Pipe fence erected along E. wall of lock on raceway side.
Steel stairways erected at N. end of lock. New walks on lock gates.
1931 - Lock unwatered and short sections of rails installed in the N.W. valve
well. New 12 x 12 timber placed on E wall just So. of Lk.
Lock signal light system installed.
1932 - replaced both lower wheels on upper left valve.
1933 - Mar. - Unwatered-new wheels on upper and lower Rt. valves, 2-10 ft. & 2-20 ft.
sections of new rails in lower left valve, corner on counterweight
side broke off and we placed plates on face of culvert wall and welded
them to rail (west side) placed equalizers on both upper valves.
May - Upper left valve would not seat. Placed needle dam in upper end burned
side seal strips and rails placed a 1" x 6" plate and bolted same
to bottom casting to prevent sides from closing in.
1935 - Pumped & overhauled.

1943 - Upper end of lock overhauled.
1944 - New cables laid from Lock 2 to Lock 3.
1945 - Light poles cut down - New lamp installed.
1946 - Valve replaced - culvert gratings repaired.
1947 - Motors on W. side of lock overhauled. One upper valve replaced.
1949 - Lock completely overhauled & rewired. New wood floor installed in
lockhouse.
1951 - New lockhouse, rewired motor panels.
1953 - Gate & valve motors W. side of lock overhauled. Replaced rub sticks,
boxed in all heat runs & insulated same. Installed storm windows
for lockhouse.
1954 - Replaced worn out rub sticks on gates. New conc. post cable -
guard rail along raceway.
1955 - Refurbished grids from gate & valve motors.
1956 - Installed timbers on approach wall. Reshingled storehouse roof.
1957 - Unwatered - Up & Low gates scraped & painted. Reconditioned valves
installed. Strips welded on seating rails, Z bars repaired, Sills
& Mitre posts repaired. New rub sticks. City water installed to
lockhouse. Oil furnace installed, lockhouse & powerhouse. Lock
ladders rebuilt. Rub sticks replaced. New walk for cable bridge.
1958 - 160' conc. poured on E. wall between Lk. #2 & #3, removed old gate house.
1959 - Contract U.S. 100, Sills lowered.
1960 - Motors at lower end overhauled, steel railings repaired & welded.
1962 - Stack lights on motor cabinets rewired, 8 motor control panels rewired.
New water line installed, motors & grids repaired.

1963 - Addition to lockhouse constructed to house motor gen. set. New upper valves, rails, cupwheels and chains. Repaired up gates & anchor arms adjusted miter timbers.

1964 - New trash racks on upper culver.

1965 - Generator relocated.

1966 - Pumped for winter - conc. repairs to up. approach wall, valve overhaul, gates painted - new seals, rubsticks, conc. repairs to lock culvert & old buffer beam recess, parking area repaired.

1967 - Resurfaced top & face of 300' up rt. approach wall, resurfaced top of rt. lock wall, plated gate recesses, built new buffer beam slots.

STRUCTURE INVENTORY - GENERAL LISTING

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
W5 F0F1 701 2A	F						BRIDGE ACROSS LIMESTONE FEEDER
W5 F0A5 701 2A	F						FARM BRIDGE OVER LIMESTONE CREEK
W5 0002 701 2B	O	116+50				103	LOCK ST BR PHOENIX
W5 0003 701 2B	C	122+65				85	BRIDGE ST BR PHOENIX
W5 0004 701 2B	O	126+30	352.8			167	CULVERT ST BR PHOENIX
W5 0007 701 2B	O	613+65				117	SWING BR AT LOCK 02
W5 0001 701 2C	E						BRIDGE OVER OLD CAUGHDENOY LOCK
W5 F0B1 701 2C	F						ANDREWS ROAD BRIDGE
W5 F0B2 701 2C	F						FARM BR. S. OF ANDREWS RD., BUTTERNUT FEEDER
W5 F0D1 701 2C	F						TWIN PIPE CULV S.LAKE RD - DERUYTER
W5 F0D2 701 2C	F						BOX CULV. E. LAKE ROAD DERUYTER
W5 F0D3 701 2C	F						FARM BRIDGE , DERUYTER INLET
W5 F0D4 701 2C	F						FARM BRIDGE , DERUYTER INLET
W5 F0D5 701 2C	F						BRIDGE OVER DERUYTER OVERFLOW
W5 0024 701 3A	E	3932+00	374.0	13.2		45	BALDWINSVILLE DAM
W5 F0B1 701 3A	F			5.0			BUTTERNUT CREEK DIVERSION DAM
W5 F0D1 701 3A	F		1288.0	70.0			DERUYTER DAM
W5 F0D2 701 3A	F						DERUYTER INLET DIVERSION DAM
W5 F0F1 701 3A	F		430.0	6.5			LIMESTONE CREEK DIVERSION DAM
W5 F0J1 701 3A	F		645.5				JAMESVILLE DAM
W5 0001 701 3A	O	117+00	343.0	11.0	6	80	PHOENIX DAM Total Dam
W5 0002 701 3A	O	608+60				10	UPPER DAM FULTON "
W5 0003 701 3A	O	681+00	335.0	17.0		10	LOWER DAM - FULTON Key
W5 0005 701 3A	O	971+00	308.0	19.5		37	DAM 5 AT MINETTO
W5 0006 701 3A	O	1146+25	290.0	33.0		37	DAM 6 -HIGH DAM AT LOCK 04 - OSWEGO

31 5 (1a)

F.A. DAM 1977

STRUCTURE ID NO: SECTION	SHEET NO	TYPE	POND + STREAM: FOOTING	APRON	SPILLWAYS: WALLS	CREST	UPSTREAM FACE	DOWNSTREAM FACE	JOINTS	FLASHBOARDS	DAM-STONE: TOP OF DAM	UPSTREAM FACE	DOWNSTREAM FACE	JOINTS	VALVE WELLS	DAM EARTH: TOP OF DAM	UPSTREAM FACE	DOWNSTREAM FACE	OUTLET CONTROL DEVICES: PIPES	PIPE JOINTS	STOP LOGS	TRASH RACKS	VALVES	CHAINS	GATE HOUSE: ROOFS	FLOORS	FOUNDATION	WALLS	STAIRS	GENERAL COMMENT	
5	0024	3A	X	X	5	5	X	7	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	~~Jomot~~ Joints need grouting
5	F081	3A	N	X	0	7	X	X	7	N	N	N	N	N	N	N	N	N	U	N	N	N	N	N	N	N	N	N	N	5	Washout under W. Wingwall resulting in collapse
*33 5	F001	3A	N	N	N	N	N	N	N	N	N	N	N	N	N	7	7	7	N	N	N	N	N	N	7	7	N	7	5	7	Underdrains plugged - need repair or replacement
*34 5	F002	3A	N	5	7	7	7	7	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	apron planks miss. leaks thru stone in crest
5	F071	3A	N	5	4	7	X	7	X	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	East W. wall settling
			X	N	N	7	X	3	0	N	7	5	1	0	N	N	N	N	N	N	N	N	N	N	5	7	X	N	7	1	bulge in downstream face, increased leak, west side, pt jts, remove br-
#1 5	E001	3A	X	X	5	7	X	7	X	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#14 5	E002	3A	X	7	7	5	X	3	X	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	
#18 5	E003	3A	X	N	5	5	X	5	5	N	5	X	5	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	
#24 5	E005	3A	X	5	5	5	X	5	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	
#26 5	E006	3A	X	X	3	5	X	5	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	
#28 5	E007	3A	X	7	7	7	X	7	5	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
5	X001	3A	3	N	3	1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	
5	X001	3A	X	5	5	3	3	3	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	

(k)

[redacted]

STRUCTURE SEC/HIST	ID NO TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
W5 0037	701 3A	O	1166+00	270.0	12.0		35	CURVED DAM AT LOCK 07 - OSWEGO
W5 X001	701 3A	X						CARPENTER BROOK DIVERSION DAM (NOT NEEDED)
W5 Y002	701 3A	Y	5090+00	375.4			5	OWASCO CREEK ENTRANCE 550FT LEFT
W5 0023	701 3C	E		369.0	8.0		H93	CAUGHDENOY DAM
W5 0124	701 3D	E	3931+50			1	635	TAINTAR GATE CONT H63-5
W5 F002	701 3D	F				1		WASTE GATE - BUTTERNUT AQUEDUCT
W5 F001	701 3D	F				2		BUTTERNUT FEEDER BULKHEAD
W5 F004	701 3D	F				4		DERUYTER INLET HEADGATES
W5 F003	701 3D	F			5.0			STREAM ENT. - DERUYTER INLET
W5 F001	701 3D	F		1200.0	3.0			DERUYTER DAM SPILLWAY
W5 F002	701 3D	F				3		DERUYTER DAM OUTLET GATES
W5 F0F1	701 3D	F				4		LIMESTONE FEEDER BULKHEAD
W5 F001	701 3D	F				1		WASTE GATE - LIMESTONE AQUEDUCT
W5 F0J1	701 3D	F						JAMESVILLE DAM SPILLWAY
W5 F0J2	701 3D	F				3		JAMESVILLE DAM OUTLET GATES
W5 0031	701 3D	O		363.0	12.0	6	80	TAINTAR GATES Key E, Movable Crest
W5 0021	701 3D	O		363.0			80	NORTH AUTO FLASHBOARD BLOCKED TOP Key D
4 W5 0051	701 3D	O		363.0			80	SOUTH AUTO FLASHBOARD BLOCKED TOP Key F
W5 0011	701 3D	O		363.0	11.0		80	NORTH SPILLWAY Key D
W5 0041	701 3D	O		363.0	11.0		80	SOUTH SPILLWAY Key F
W5 0012	701 3D	O		352.8	10.3		10A	SPILLWAYS Key H
6 W5 0022	701 3D	O				6	10A	TAINTOR GATES Key I
W5 0001	701 3D	O	661+00	311.0			205	SPILLWAY IN DIKE BELOW LOCK 03
7 W5 0005	701 3D	O	1180+75				35	BY-PASS CULVERT ABOVE LK 07 2 GATES -
W5 0007	701 3D	O	1184+80			1	709	FEED GATE - LOCK 07

SLUICE GATES, SPILLWAYS, WASTE WEIRS - 1977

3D-5 2a

	STRUCTURE ID NO: SECT	STRC NO	TYPE	CONCRETE: ABTMNTS	PIERS BLKHDS	UPSTRM APRON	DWNSTRM APRN	SPLLWY SRFCE	SPLWY INTRIOR	SUPER STRUCTURE: OPRTNG TRESTLE	CATWALKS	RAILINGS	MACHINERY: STEM GEARING	FLR STD ETC	SL GATES: SPNE VLVL LNE	GATE FRAME	GATE SKIN PLATE	GATE SEALS	SEATS	GUIDES	GATES FLSHBRDS: BOARDS	ANCHORS	STPLGS: STOPLOGS	GUIDES	ELECT: MOTORS	WIRING	TRASH RACKS	GEN RECOMMEND	
	5	0126	3D	7	7	X	X	7	N	7	7	7	7	N	N	7	7	7	7	7	N	N	N	N	7	7	N	7	N. cable frayed
	5	F002	3D	7	N	N	N	N	N	N	N	N	N	N	N	7	7	7	6	7	N	N	N	7	N	N	N	7	
	5	F001	3D	7	7	X	X	X	N	N	N	N	N	N	N	X	X	X	X	7	N	N	N	7	N	N	N	7	
#35	5	F00A	3D	7	7	X	7	N	N	7	7	7	7	7	N	7	7	7	7	7	7	7	N	N	N	N	7	7	clear brush out of walls, clean silt + debris above
#36	5	F003	3D	7	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	some stones moved
#37	5	F001	3D	7	N	7	7	6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	broken floor stand
#38	5	F002	3D	N	N	N	N	N	N	7	N	N	5	1	N	X	X	7	7	X	N	N	N	N	N	N	N	3	
	5	F001	3D	7	5	X	7	N	N	N	7	7	N	N	N	N	N	N	N	N	N	N	7	7	N	N	N	7	
	5	F002	3D	7	N	N	N	N	N	N	N	N	N	N	N	N	5	5	5	5	N	N	N	N	N	N	N	5	Abutment needs pointing
	5	F001	3D	7	N	X	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
	5	F002	3D	N	N	N	N	N	N	3	N	N	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	3	
#2	5	0081	3D	1	1	N	X	N	N	N	3	3	5	5	N	1	1	1	X	N	N	N	N	N	N	N	N	1	main anch poor, elect poor, finish paint, all conc. poor
#3	5	0091	3D	5	N	N	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#4	5	0051	3D	6	N	N	X	6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#5	5	0011	3D	5	N	N	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#6	5	0041	3D	3	N	N	X	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#15	5	0012	3D	3	1	N	5	1	N	N	N	N	N	N	N	N	N	N	N	N	7	3	N	N	N	N	N	3	6"+/- of surface worn away, corner pier-v poor, hole in spill crest
#11	5	[illegible]	3D	7	7	N	5	7	N	N	7	7	7	7	N	5	3	3	7	N	N	N	N	N	N	N	N	3	align racks + pinion, paint, leakage thru abut wall
	5	[illegible]	3D	3	N	N	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	
#29	5	0005	3D	7	7	N	X	X	N	6	N	N	7	7	N	7	7	7	7	7	N	N	N	N	N	N	N	6	
#30	5	0007	3D	7	N	X	N	N	N	7	N	N	7	7	N	7	7	7	7	7	N	N	N	N	7	7	X	7	
	5	0002	3D	5	N	N	N	7	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	Paint frame holding grating
	5	0003	3D	7	N	N	N	7	N	N	7	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
	5	1001	3D	5	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	

[redacted]

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
W5 0002 701 3D	O	1191+00	255.0			H64	SIDE SPILLWAY BETWEEN LOCKS 07 & 08
W5 0003 701 3D	O	1203+71	255.8			H64	SIDE SPILLWAY WEST WALL ABOVE LOCK 8
W5 Y001 701 3D	Y	60+15				T20	ONONDAGA CREEK SPILLWAY
W5 0224 701 3E	E	3931+90				208	TAINTOR GATE NW POWER RACE 530 FT L
W5 F001 701 3E	F						OVERFLOW FLUME -DERUYTER DAM
W5 F002 701 3E	F						DERUYTER OUTLET FLUME
W5 0051 701 3E	O	118+80			3	80	SOUTH HEADGATE NO 1 PLUGGED Key G
W5 0061 701 3E	O	119+10			4	80	SOUTH HEADGATE NO 2 PLUGGED " "
W5 0071 701 3E	O	119+40			3	80	SOUTH HEADGATE NO 3 PLUGGED " "
W5 0011 701 3E	O	121+80	352.0	13.3	8	80	NORTH HEADGATE NO 1 Raceway SILL
W5 0021 701 3E	O	121+56			3	80	NORTH HEADGATE NO 2 PLUGGED Key C
W5 0031 701 3E	O	121+42			3	80	NORTH HEADGATE NO 3 PLUGGED " "
W5 0041 701 3E	O	121+28			3	80	NORTH HEADGATE NO 4 PLUGGED " "
W5 0053 701 3E	O	640+00				108	POWER FOREBAY - LOCK 03 - FULTON Key D
W5 0043 701 3E	O	640+35			2	108	BULKHEAD NO 4 W SIDE LOWER DAM Key M
W5 0033 701 3E	O	640+50			10	108	BULKHEAD NO 3 W SIDE LOWER DAM " "
W5 0023 701 3E	O	642+20			3	108	BULKHEAD NO 2 E SIDE LOWER DAM Key H
W5 0063 701 3E	O	652+00				10	POWER TAILRACE BELOW LOCK 03 Key P
W5 0005 701 3E	O	972+15				37	BULKHEAD NO 5 - MINETTO
W5 0052 701 3E	O				17	10	BULKHEAD NO 5 (UPPER DAM) Key G
W5 0006 701 3E	O	1145+90			24	37	BULKHEAD NO 6 - HIGH DAM - OSWEGO
W5 0077 701 3E	O	1169+06			24		BULKHEAD NO7 - CURVED DAM - OSWEGO
W5 0017 701 3E	O	1185+00				35	HYDRAULIC CANAL BULKHEAD (SEALED)
W5 0001 701 4A	E		369.0			T20	CLEVELAND TERMINAL
W5 0002 701 4A	E						DOCK-FRENCHMANS IS

B-7

3E-546

3a

SLUICE GATES SPILLWAYS WASTE WEIRS - 1977

STRUCTURE ID NO SCTN	STRUCTURE ID NO STRC	STRUCTURE ID NO TYPE	CONCRETE ABTMNTS	CONCRETE PIERS BLKHDS	CONCRETE UPSTRM APRON	CONCRETE DWNSTRM APRN	CONCRETE SPLLWY SRFCE	CONCRETE SPHN INTRIOR	SUPER STRUCTURE OPRTNG TRSTLE	SUPER STRUCTURE CATWALKS	SUPER STRUCTURE RAILINGS	MACHINERY STEM GEARING	MACHINERY FLR STD ETC	MACHINERY SPHN VLVL LNR	SL GATES GATE FRAME	SL GATES GATE SKN PLATE	SL GATES GATE SEALS	SL GATES SEATS	SL GATES GUIDES	GATES FLSHBRDS BOARDS	GATES FLSHBRDS ANCHORAGE	STPLGS STOPLOGS	STPLGS GUIDES	ELECT MOTORS	ELECT WIRINGS	TRACKS RACKS	GEN RECOMMEND
5	0224	3E	5	N	X	X	X	N	7	7	7	7	7	N	6	6	X	X	N	3	3	N	N	N	N	N	5
5	F001	3E	N	N	N	N	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3
5	F002	3E	7	N	N	U	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	9
5	0051	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
5	0061	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
5	0071	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
5	0011	3E	5	5	X	X	N	N	7	5	3	7	3	N	3	3	3	3	3	N	N	N	N	N	N	N	3
5	0021	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
5	0031	3E	3	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
5	0041	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
5	0053	3E	6	6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	9
5	0043	3E	7	5	X	X	N	N	N	N	7	3	5	N	X	X	X	X	X	N	N	N	N	N	N	N	5
5	0033	3E	7	5	X	X	N	N	N	N	7	3	5	N	X	X	X	X	X	N	N	N	N	N	N	N	5
5	0023	3E	5	5	X	X	N	N	N	N	7	3	5	N	X	X	X	X	X	N	N	N	N	N	N	N	3
[illegible]	[illegible]	3E	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3
5	0005	3E	5	3	N	N	N	N	7	3	7	3	N	N	3	1	3	N	N	N	N	N	N	N	N	N	3
5	0052	3E	7	5	X	X	N	N	N	7	N	3	3	N	3	X	X	X	X	N	N	N	N	N	N	N	5
5	0006	3E	3	5	N	N	N	N	7	7	N	N	3	N	5	4	X	X	5	N	N	N	N	N	N	N	5
5	0077	3E	7	7	X	X	N	N	5	N	7	N	3	N	3	3	X	X	3	N	N	N	N	3	N	N	5
5	0017	3E	3	5	X	X	N	N	N	N	N	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	7
6	S002	3E	5	5	N	X	N	N	N	N	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	-	7
6	S001	3E	7	7	N	X	N	N	N	7	N	7	7	N	6	6	6	6	N	N	N	N	N	N	N	N	7
6	Y001	3E	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7

3/12 [illegible] dump fill + debris [illegible] to Seal sluice at [illegible]

B-8

Form IW41. 11-6-16-1000 (10-1000)

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK
CONSERVATION COMMISSION
ALBANY

DAM REPORT

111 Os'go

5/24/ , 1912
(Date)

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the #7 or Lower Fulton Dam.

This dam is situated upon the Oswego River (Give name of stream) in the Town of between Volney & Granby, Oswego County ~~about~~ in (State distance) ~~from~~ the ~~Village or~~ City of Fulton.

The distance down (Up or down) stream from the dam, to the Lower Bridge (Give name of nearest important stream or of bridge) is about 600 ft. (State distance).

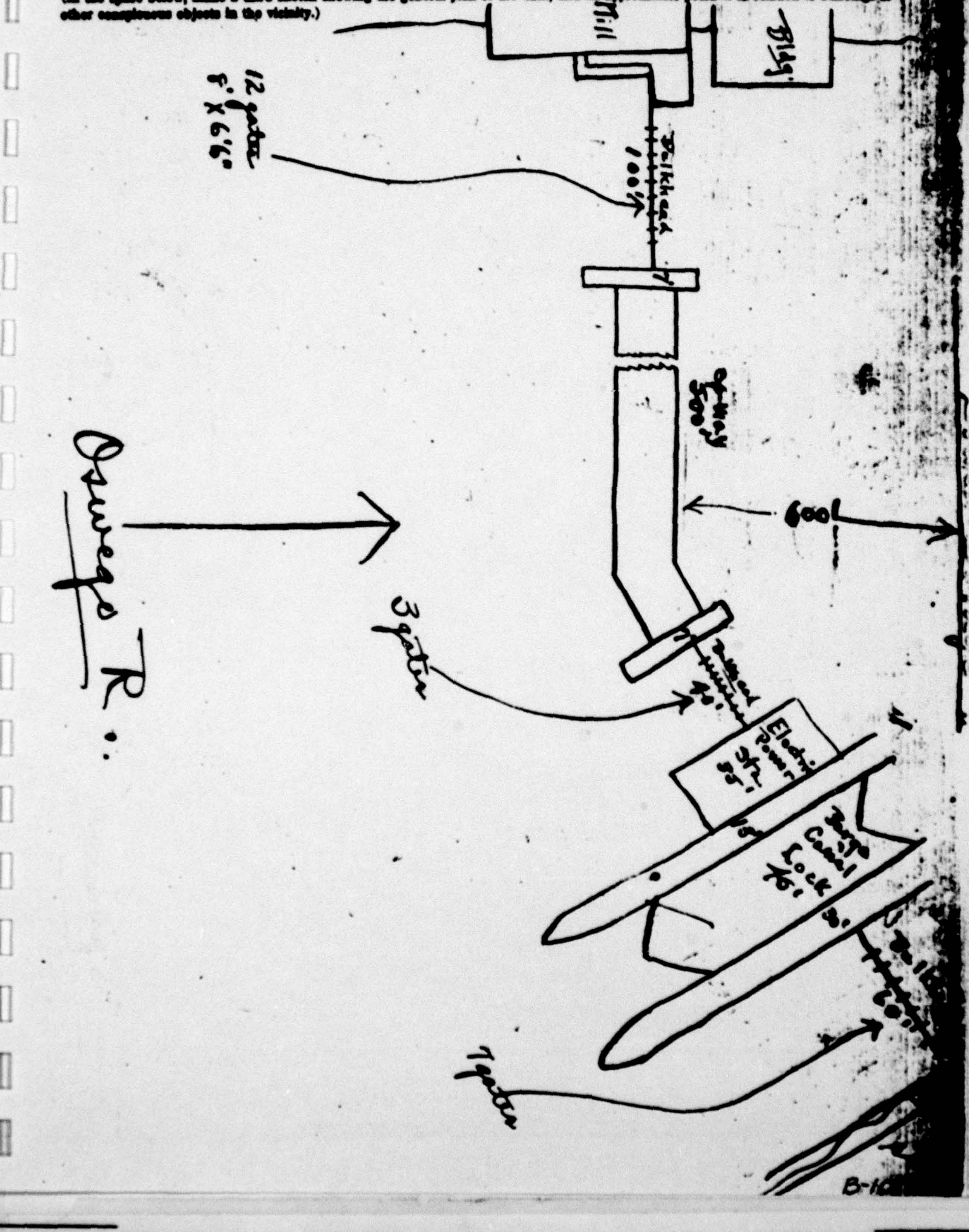
The dam is now owned by New York State (Give name and address in full) and was built in or about the year 1917, and was extensively repaired or reconstructed during the year ——.

As it now stands, the spillway portion of this dam is built of masonry, concrete (State whether of masonry, concrete or timber) and the other portions are built of concrete (State whether of masonry, concrete, earth or timber with or without rock fill)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is solid rock and under the remaining portions such foundation bed is solid rock

B-

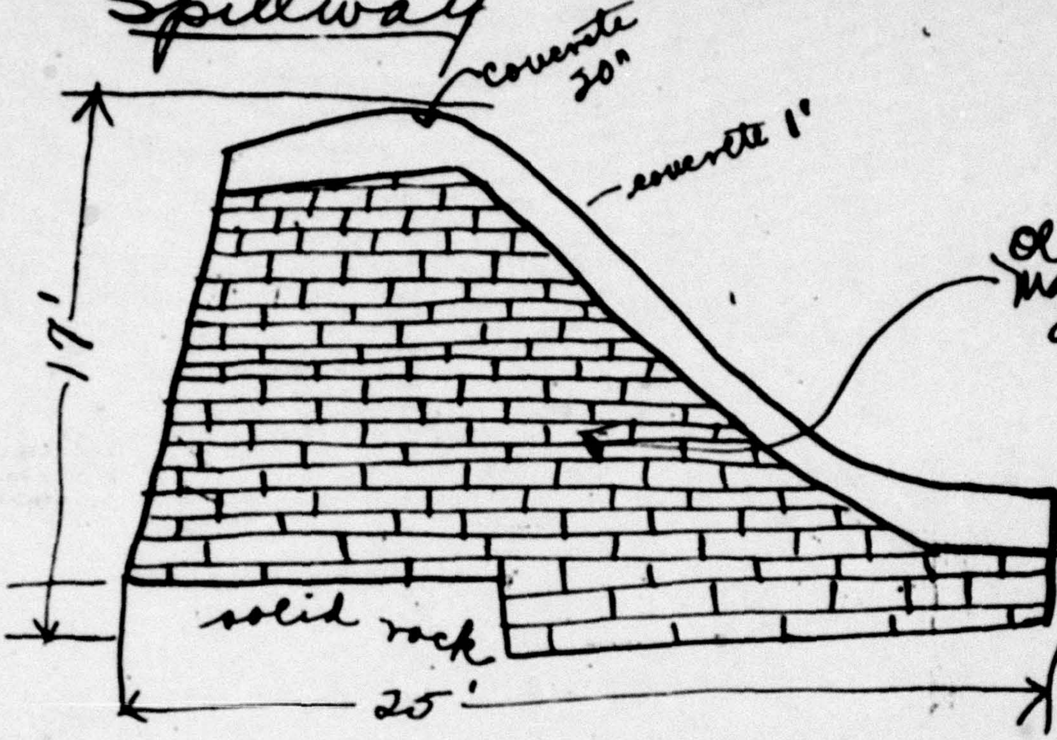
(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)



B-10

(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)

Spillway



The concrete abutments at the ends of the spillway are 7' across and $7\frac{1}{2}$ ft. above the spillway. The other piers and abutments are at about the same level above the spillway. This is all state work and abutments which are plumb on the face have a batter of from 4 on 1 to 2 on 1 on the back.

The total length of this dam is 900 feet. The spillway or waste-weir portion, is about 300 feet long, and the crest of the spillway is about 7 1/2 feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: none

At the time of this inspection the water level above the dam was — ft. 4 in. ~~below~~ above the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

Excellent condition. No leaks or cracks —

#

Reported by C.W.H. Douglass (Signature)

115 Standart St., (Address—Street and number, P. O. Box or R. F. D. route)

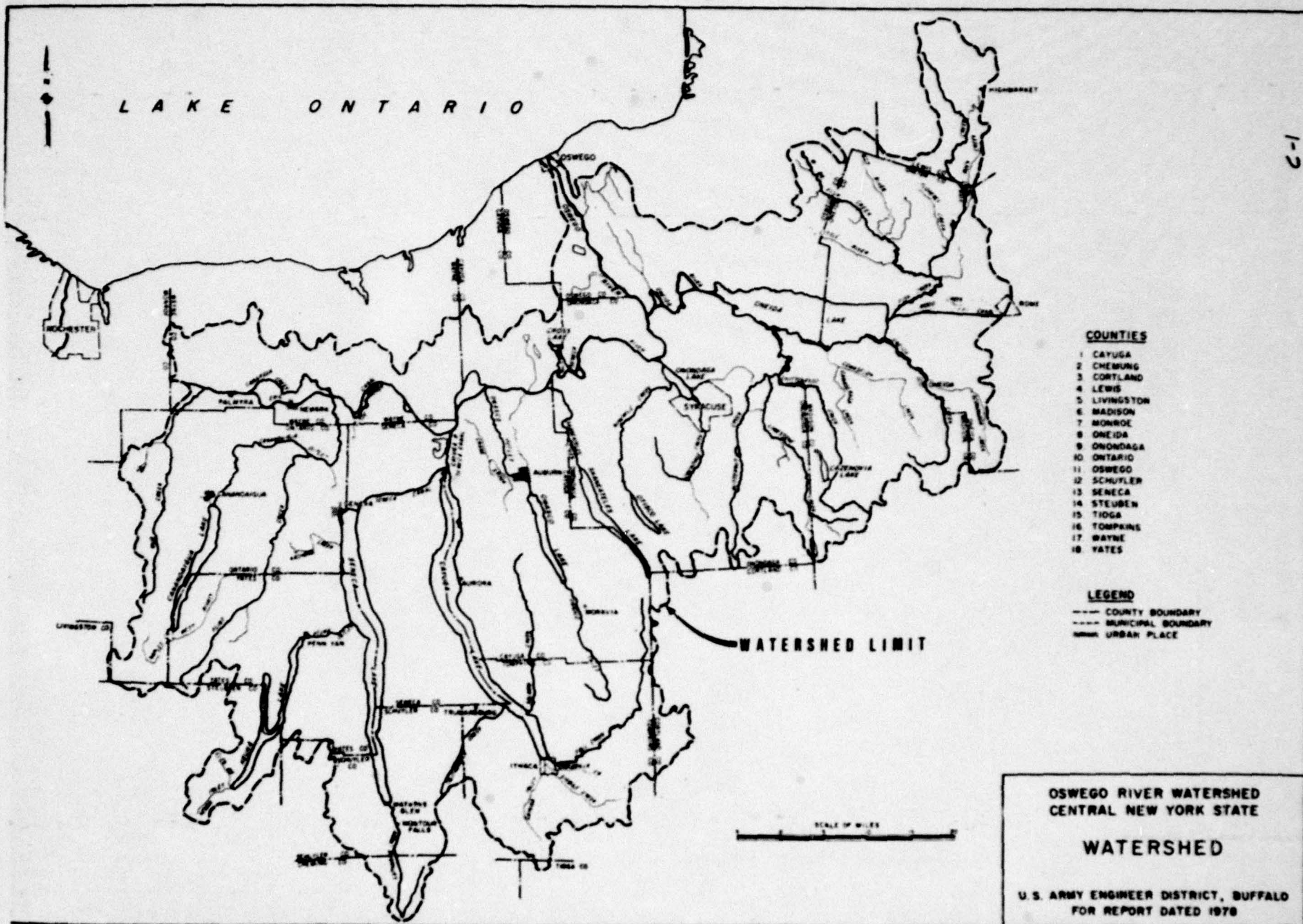
Syracuse, N.Y. (Name of place)

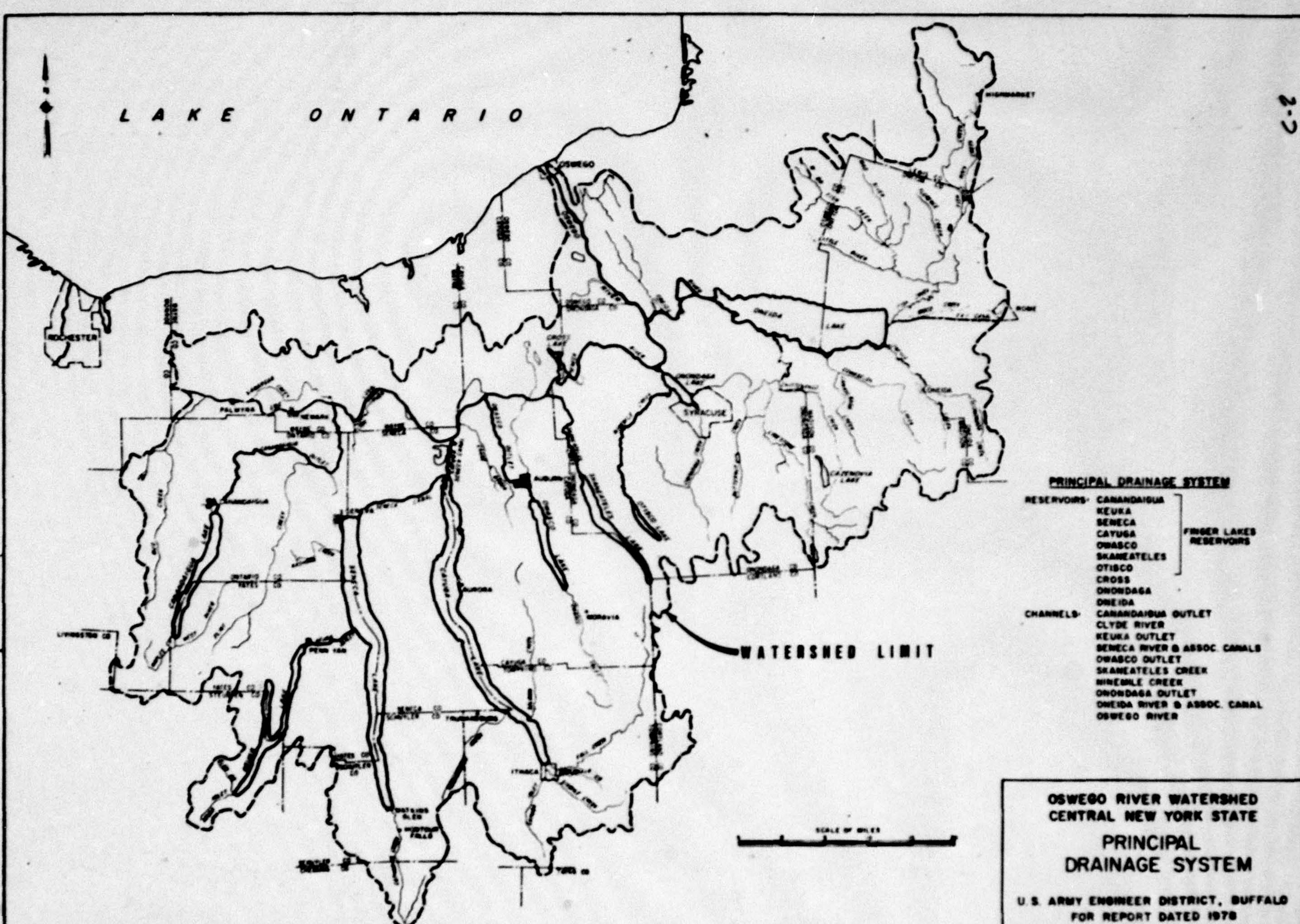
B-12

APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

<u>HYDROLOGY</u>


LAKE ONTARIO
OSWEGO
ROCHESTER
SYRACUSE
ITHACA
AURORA
MORAVIA
PENN YAN
WATKINS GLEN
MONTOUR FALLS
ROME
WATERSHED LIMIT
SCALE OF MILES
COUNTIES
1 CAYUGA
2 CHEMUNG
3 CORTLAND
4 LEWIS
5 LIVINGSTON
6 MADISON
7 MONROE
8 ONEIDA
9 ONONDAGA
10 ONTARIO
11 OSWEGO
12 SCHUYLER
13 SENECA
14 STEUBEN
15 TIOGA
16 TOMPKINS
17 WAYNE
18 YATES
LEGEND
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
URBAN PLACE
OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE
WATERSHED
U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978



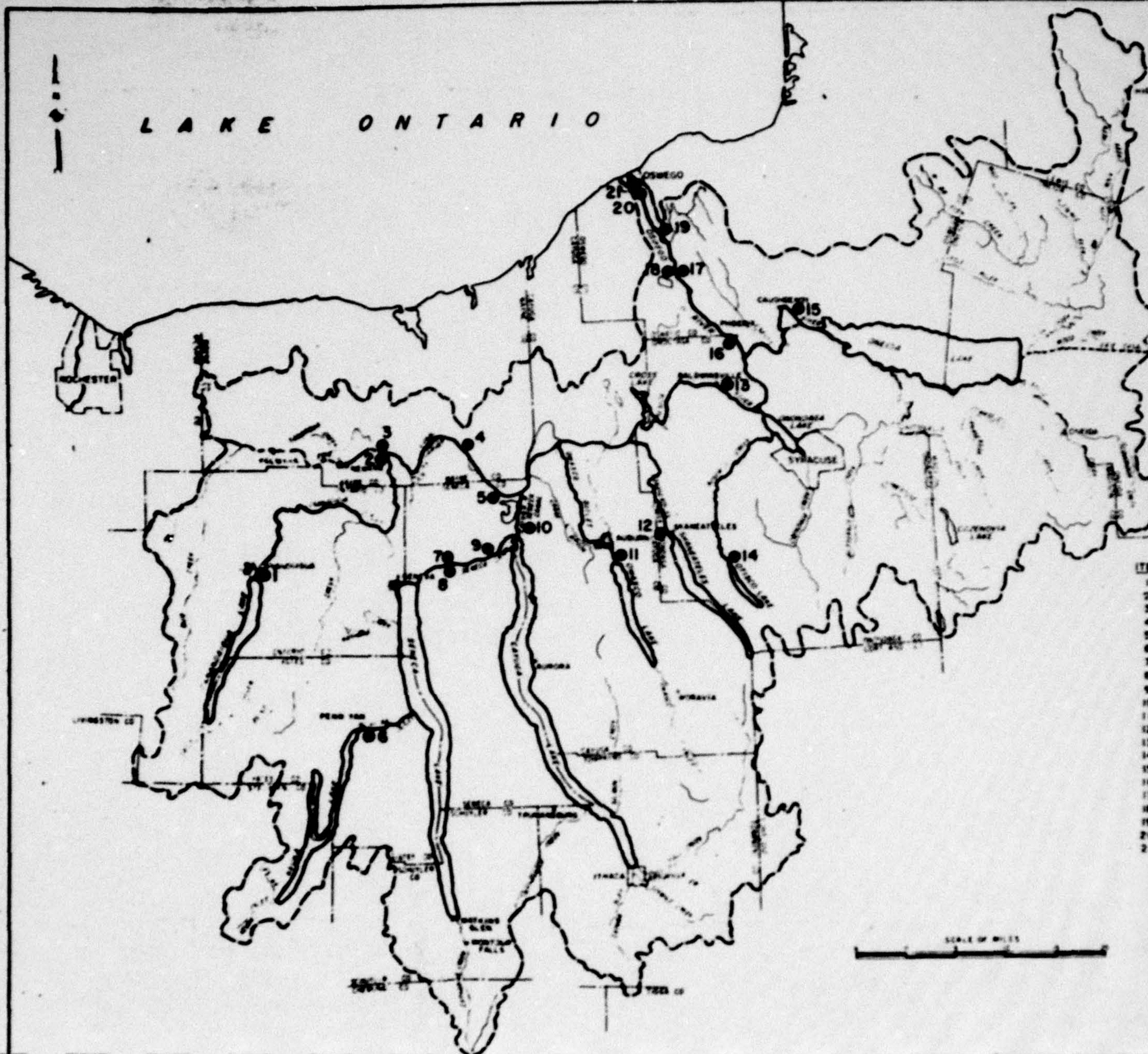
OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

PRINCIPAL
DRAINAGE SYSTEM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

PLATE 3

C-2



WATER MANAGEMENT FACILITY

ITEM	DESCRIPTION	LOCATION
1	GATED LAKE OUTLET	CANANDAIGUA
2	GATED RIVER DAM	LYONS
3	GATED RIVER DAM	LYONS
4	GATED RIVER DAM	CLYDE
5	GATED RIVER DAM	MAYS-POINT
6	GATED LAKE OUTLET	PENN YAN
7	GATED HYDRO-PLANT SPILLWAY	WATERLOO
8	GATED RIVER DAM	WATERLOO
9	GATED RIVER DAM	SENECA FALLS
10	FATED LAKE OUTLET	MUD LOCK
11	GATED LAKE OUTLET	AUBURN
12	GATED LAKE OUTLET	SKANEATELES
13	GATED RIVER DAM	BALDWINSVILLE
14	GATED LAKE OUTLET	MARIETTA
15	GATED RIVER DAM	CAUGHDENOY
16	GATED RIVER DAM	PHOENIX
17	GATED RIVER DAM	FULTON
18	GATED RIVER DAM	FULTON
19	GATED RIVER DAM	MINETTO
20	GATED RIVER DAM	OSWEGO
21	GATED RIVER DAM	OSWEGO

OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

WATER RESOURCE MANAGEMENT
FACILITIES OF THE
PRINCIPAL DRAINAGE SYSTEM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

C-3

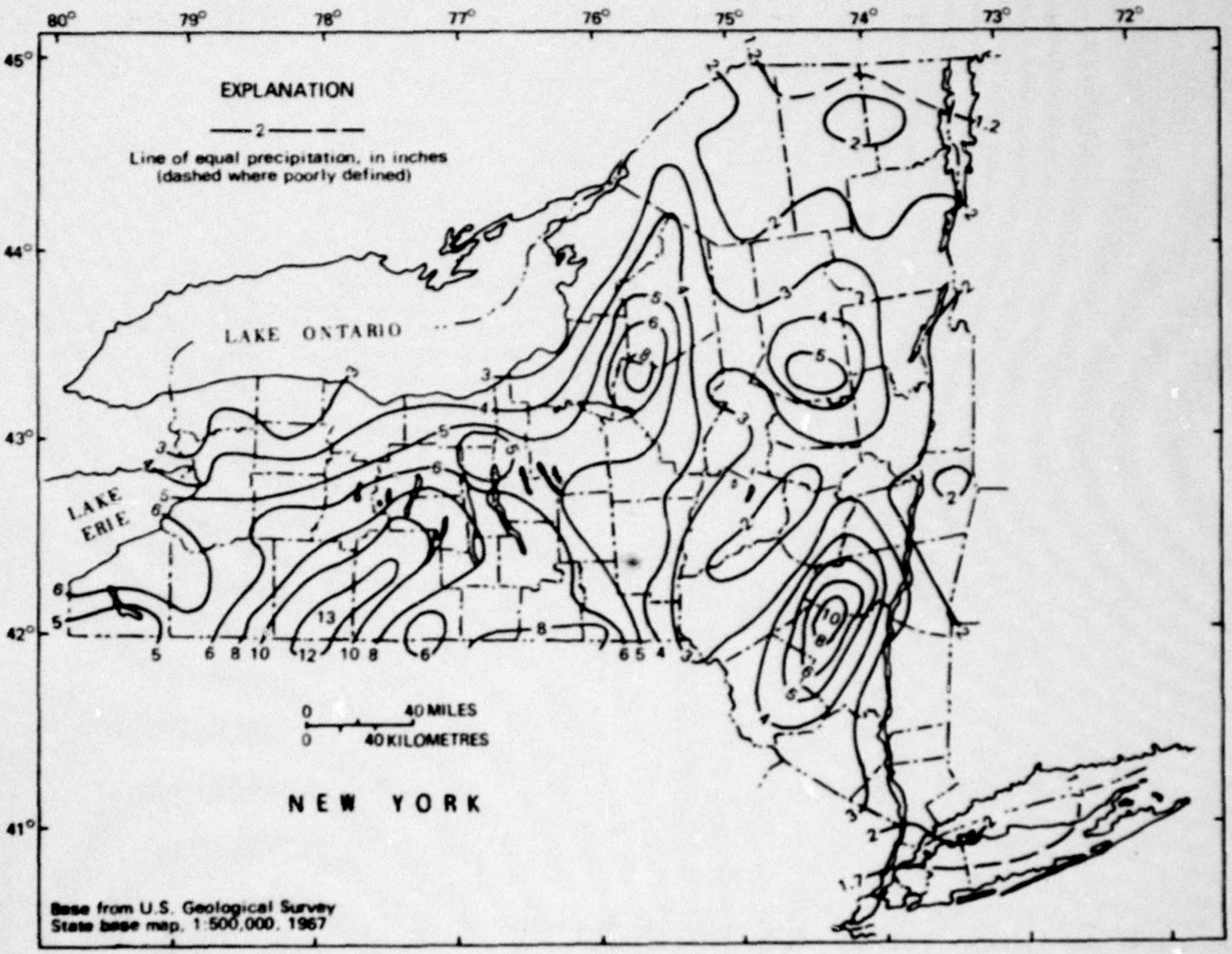
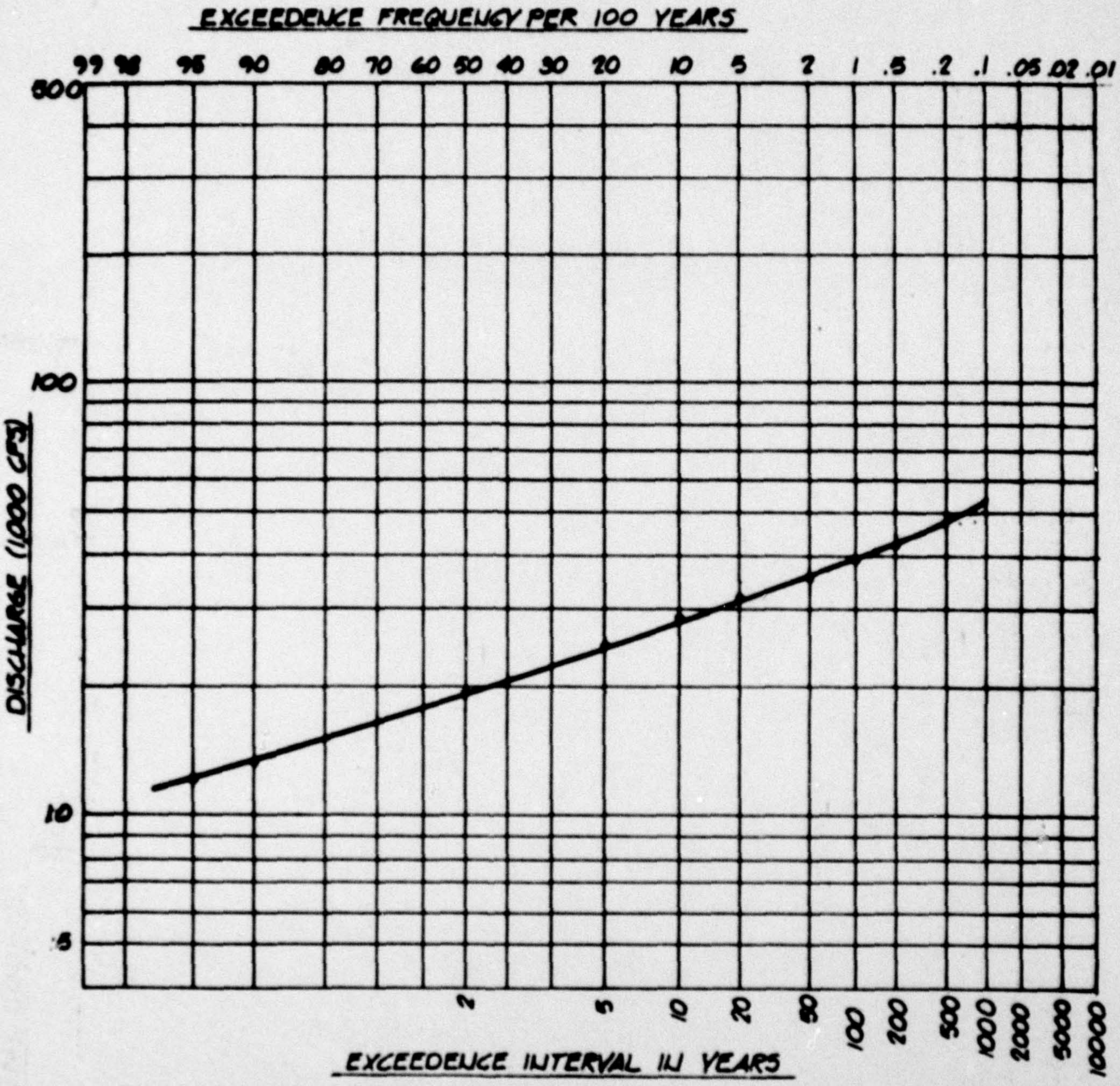


Figure 3.--Precipitation in New York, June 20-25. (Adapted from map furnished by A. B. Pack, Climatologist, National Weather Service, Ithaca, New York.)

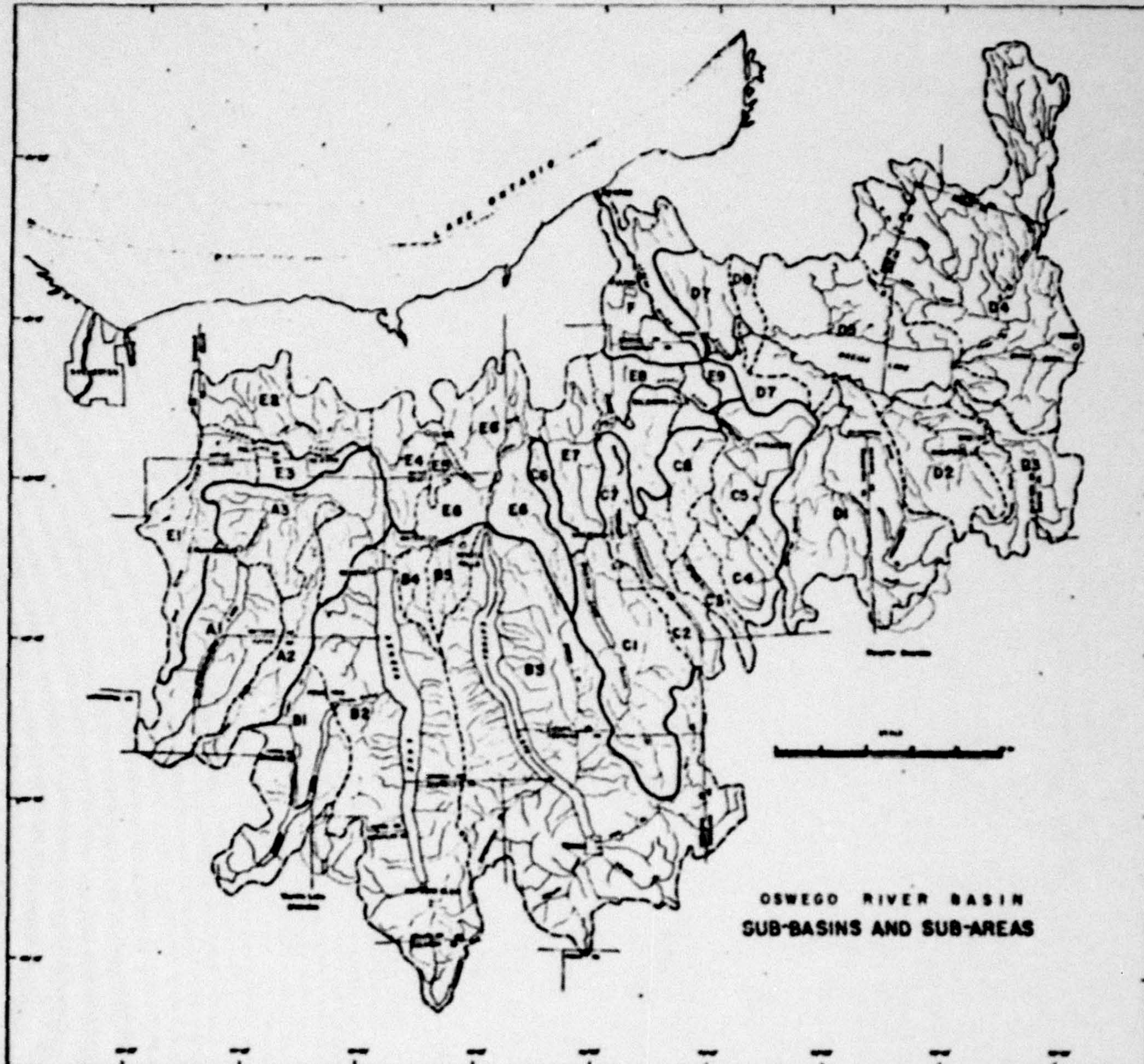


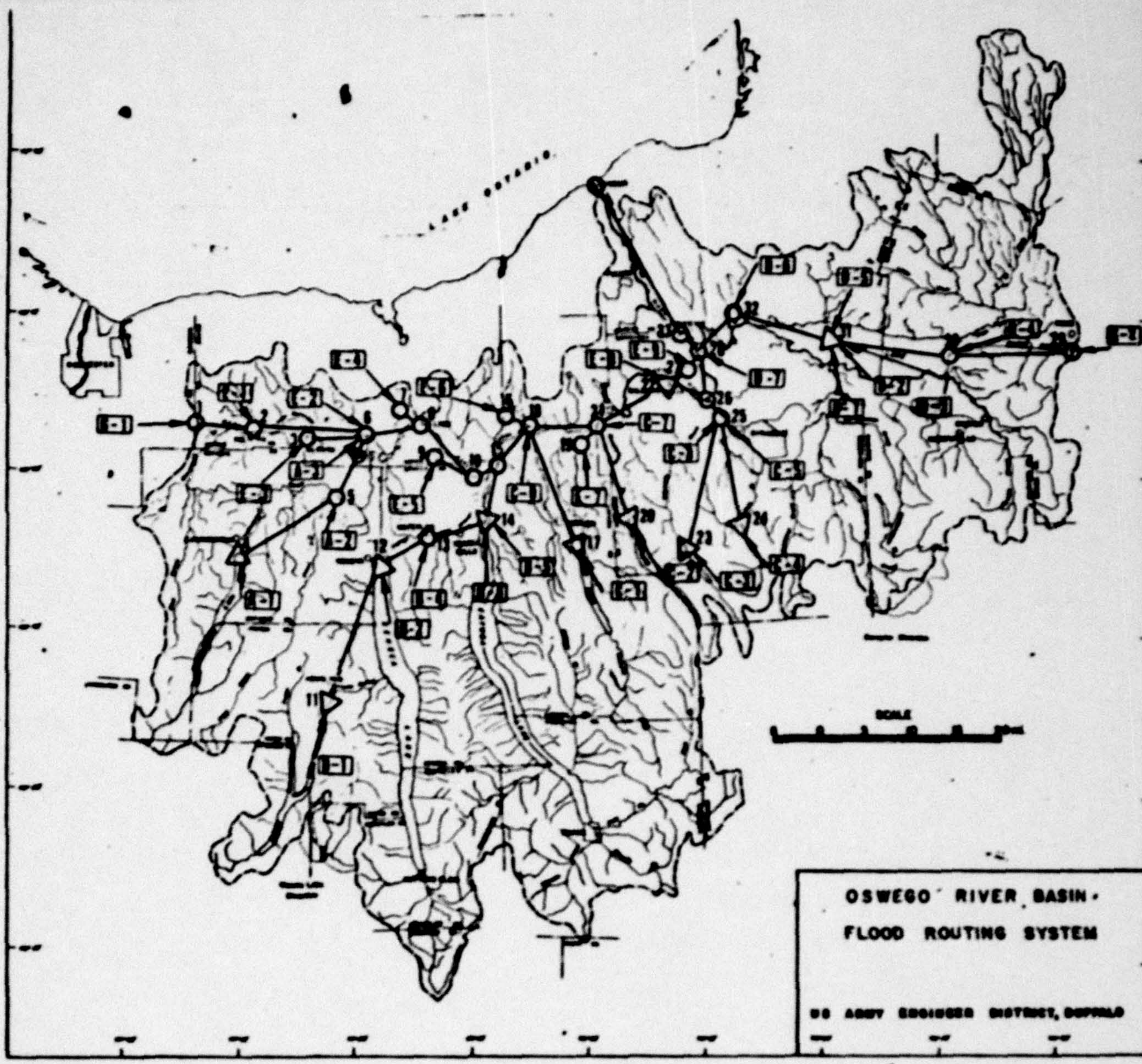
NOTE: DISCHARGE - FREQUENCY CURVE CONVERTED FROM STAGE - FREQUENCY CURVE, USING STAGE - DISCHARGE RATING CURVES DEVELOPED BY D.E.C.

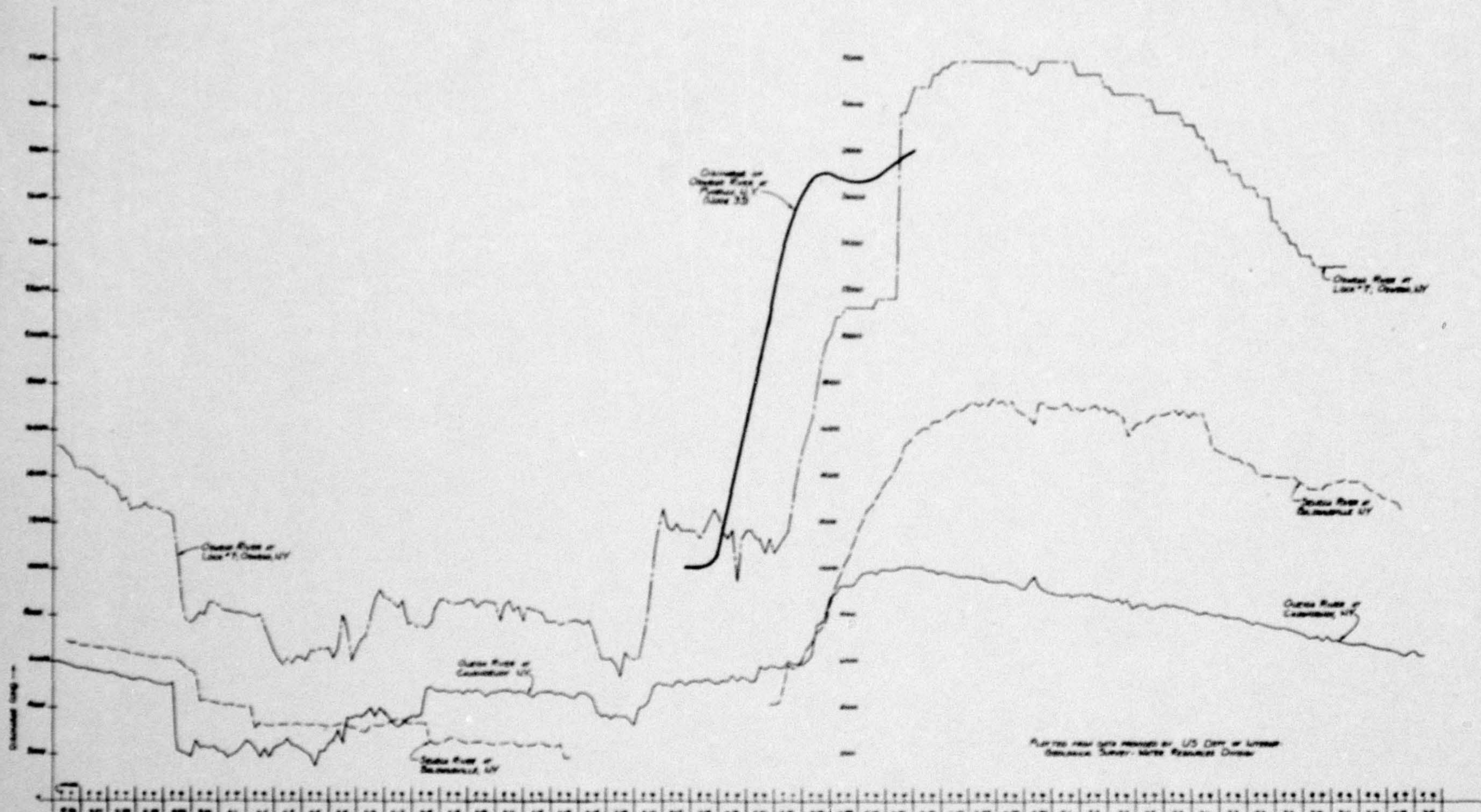
DISCHARGE - FREQUENCY CURVE

C-5

STETSON • DALE	DATE 6-27-79	DRAWN JPG	THREE RIVERS (NODE 28)
	JOB 2305	APP'D	


OSWEGO RIVER BASIN
SUB-BASINS AND SUB-AREAS
A1
A2
A3
B1
B2
B3
B4
B5
C1
C2
C3
C4
C5
C6
C7
C8
D1
D2
D3
D4
D6
D7
D8
E1
E3
E4
E5
E6
E7
E8
E9
F


LAKE ONTARIO
SCALE
OSWEGO RIVER BASIN
FLOOD ROUTING SYSTEM
US ARMY ENGINEER DISTRICT, BUFFALO



DISCHARGE CURVES
OSWEGO RIVER WATERSHED

STETSON-DALE

C-8

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6-28-79

SUBJECT: OSWEGO RIVER CURVED DAM - LOCK #7 — PROJECT NO. 2205

DISCHARGE - FREQUENCY RANKING — DRAWN BY: JRG

WATER YR	PEAK DISCHARGE	DATE	RANKING	DISCHARGE PLOT POSN.
1936	37500 CFS	3·28·36	1	.02
1940	35000 CFS	4·10·40	2	.04
1972	32300 CFS	6·27·72	3	.06
1960	31200 CFS	4·4·60	4	.08
1950	29400 CFS	3·30·50	5	.11
1956	26800 CFS	4·13·56	6	.13
1942	25900 CFS	3·18·42	7	.15
1943	25400 CFS	5·15·43	8	.17
1947	25100 CFS	4·8·47	9	.19
1955	23600 CFS	3·23·55	10	.21
1951	23500 CFS	2·22·51	11	.23
1945	23400 CFS	3·26·45	12	.25
1939	23200 CFS	3·8·39	13	.28
1959	23100 CFS	4·6·59	14	.30
1973	23000 CFS	4·7·73	15	.32
1961	22700 CFS	2·26·61	16	.34
1971	22600 CFS	3·18·71	17	.36
1902	22500 CFS	3·13·02	18	.38
1904	22200 CFS	4·02·04	19	.40
1946	22000 CFS	10·4·46	20	.42
1963	21900 CFS	3·28·63	21	.45
1970	21600 CFS	4·6·70	22	.47
1905	21300 CFS	3·28·05	23	.49
1937	21200 CFS	4·24·37	24	.51
1969	20900 CFS	2·4·69	25	.53
1903	20300 CFS	3·35·03	26	.55
1954	20000 CFS	5·9·54	27	.57
1941	19900 CFS	4·7·41	28	.60
1974	19900 CFS	4·7·74	29	.62
1958	19100 CFS	4·23·58	30	.64
1952	18700 CFS	3·12·52	31	.66
1948	18400 CFS	3·26·48	32	.68

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME New York State Dam Inspection DATE 6·28·79

SUBJECT Oswego River Curved Dam - Lock #7 PROJECT NO. 1305

Discharge - Frequency Ranking DRAWN BY JPG

Water Yr	Peak Discharge	Date	Ranking	Discharge Plot Posi.
1968	18100 CFS	6·30·68	33	.70
1953	18000 CFS	3·28·53	34	.72
1938	18000 CFS	3·1·38	35	.74
1966	17600 CFS	3·6·66	36	.77
1964	17500 CFS	3·18·64	37	.79
1935	16900 CFS	7·14·35	38	.81
1934	16400 CFS	4·15·34	39	.83
1949	16300 CFS	2·17·49	40	.85
1944	16000 CFS	4·14·44	41	.87
1957	15200 CFS	3·15·57	42	.89
1962	15200 CFS	3·16·62	43	.91
1906	14900 CFS	4·10·06	44	.94
1965	13200 CFS	4·26·65	45	.96
1967	12900 CFS	5·17·67	46	.98

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6·26·79

SUBJECT: EXPANSION OF STAGE - DISCHARGE CURVES TO UPPER LIMITS — PROJECT NO. 2305

DRAWN BY: JPA & NFO

SENECA LAKE $Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$ ASSUME: n = .035

HEIGHT	1.49/n	A	R	S	Q	STORAGE
10	42.57	10600	10	.001	66745	800000
20	42.57	24800	20	.001	248455	1200000

CANANDAIGUA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	106, 500
10	42.57	10000	10	.001	62965	212, 500
20	42.57	20000	20	.001	200366	319, 000

KEUKA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	217000
10	42.57	10000	10	.004	111550	328550

CAYUGA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.0005	0	727000
3	42.57	15000	3	.0005	29810	854500
6	42.57	30000	6	.0005	94858	982000

OWASCO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.006	0	119800
3	42.57	3000	3	.006	20,653	126500
6	42.57	6000	6	.006	65,720	152900
9	42.57	9000	9	.006	129,350	205700

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6-27-79

SUBJECT: EXPANSION OF STAGE - DISCHARGE CURVES TO UPPER LIMITS — PROJECT NO. 2305

DRAWN BY: JPG

OTISCO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	39,200
3	42.57	900	3	.004	5060	45700
6	42.57	1800	6	.004	16100	52300
9	42.57	2700	9	.004	31700	58800
12	42.57	3600	12	.004	51200	65300

ONONDAGA LAKE

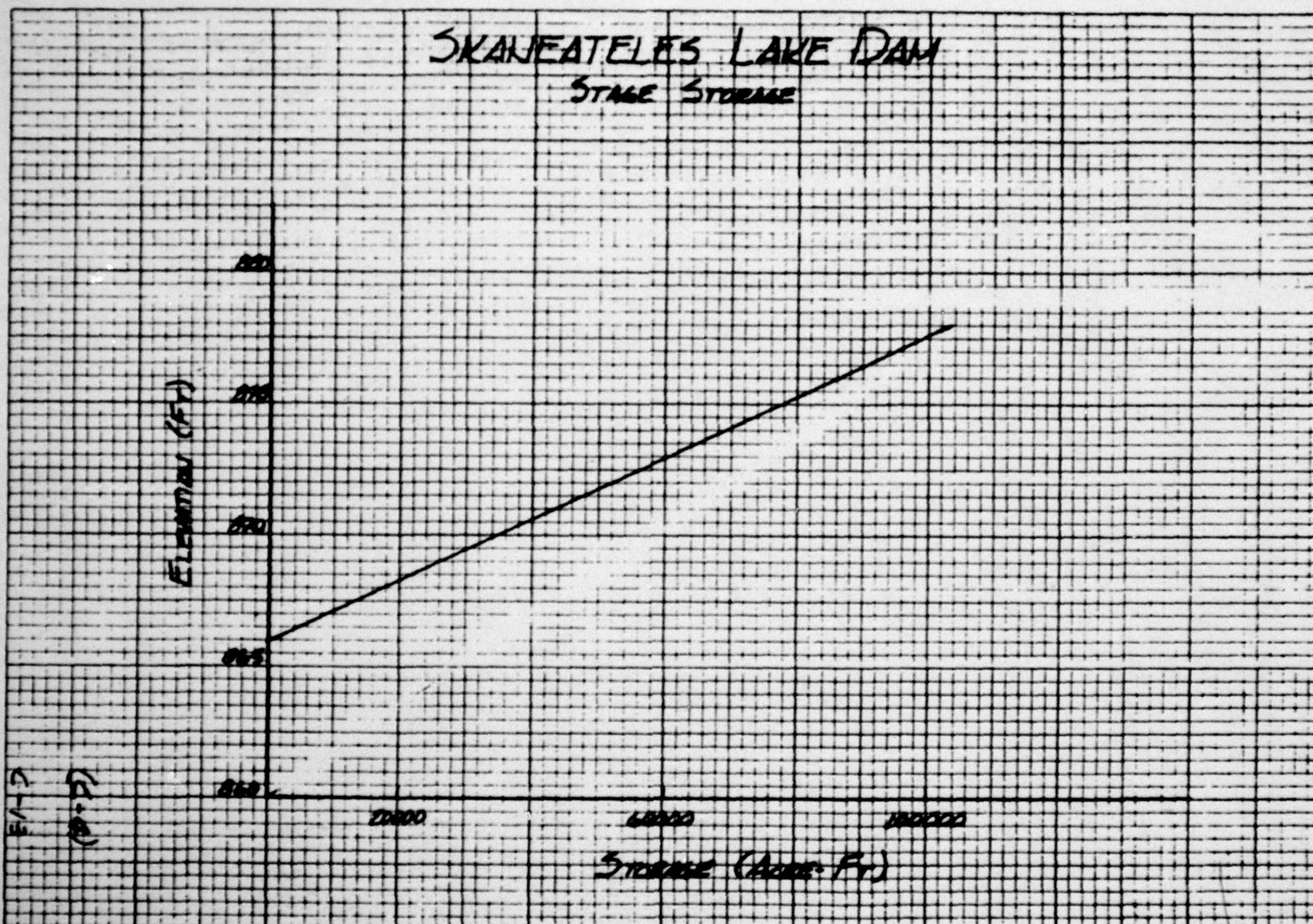
HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	32500
3	42.57	1500	3	.001	4200	43500
6	42.57	3000	6	.001	13400	52300
9	42.57	4500	9	.001	26400	62200
12	42.57	6000	12	.001	42700	72100

ONEIDA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	845000
3	42.57	6000	3	.001	16900	998000
6	42.57	12000	6	.001	53700	1150000
9	42.57	18000	9	.001	105600	1304000

SKANEATELES LAKE

SEE SKANEATELES DAM INSPECTION REPORT DATE: SEPT 14/78
SHEETS C-4 & C-5


SKANEATELES LAKE DAM
STAGE STORAGE
ELEVATION (FT)
865
860
20000
60000
100000
STORAGE (ACRE-FT)

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME: NY DAM INSPECTION — DATE: 9-15-78

SUBJECT: SKANEATELES LAKE DAM — PROJECT NO. 2210

DRAWN BY: JBG

STAGE - DISCHARGE TABULATION (FROM CREST OF SPILLWAY)

ELEV		Q PRINCIPAL SPILLWAY	Q DAM	Q TOTAL
866		—	—	—
867		124.80	—	124.80
868		352.99	—	352.99
868.5	(TOP OF DAM)	493.32	—	493.32
869		648.48	98.11	746.59
870		998.40	509.80	1508.20
871		1395.31	1096.92	2492.23
872		1834.18	1817.04	3651.22
873		2311.33	2649.00	4960.33
874		2829.90	3579.37	6409.27
875		3369.60	4598.68	7968.28
876		3946.52	5699.74	9646.26
877		4553.06	6876.88	11429.94
878		5187.84	8125.47	13313.31
879		5849.65	9441.63	15291.28
880		6537.42	10822.06	17359.48

(C-5)

```
ID                    OSWEGO RIVER BASIN
A                          HEC1DB
A                     PMF- OVERFLOW ANALYSIS
B      40       6       0       0       0       0       0       0       4
B1      5
J       1       6       1
J1     .2      .4      .5      .6      .8     1.0
K       0       1       0       0       0       0       1
K1          1 BARGE CANAL LOCK 30 AT MACEDON  (SUB AREA A1)
M      -1       0     100       0    5100       0       0       0       1
N     372     372     372     372     374     378     379     379     386     392
N     390     380     375     372     113      23      25      21      21      22
N      22      21      22      22      21      21      22      22      22       0
N
K       1       2       0       0       0       0       1
K1          2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)
Y       0       0       0       0       1
Y1      0       3       1
K       0       2       0       0       0       0       1
K1          3 GANARGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)
M       1      -1     147       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.05
U      21
O     514    1946    2958    2655    1978    1472    1095     815     515     389
O     366     250     186     138     103      76      57      42      25      25
O      21
X     140     550     1.6
K       2       2       0       0       0       0       1
K1          4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29
K       1       6       0       0       0       0       1
K1          5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS
Y       0       0       0       0       1
Y1      0       0       3
K       0       6       0       0       0       0       1
K1          6 LOWER GANARGUA LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)
M       1      -1     110       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.05
U      27
O      28     109     293     523     696     773     896     988    1246    1312
O    1218     979     764     596     465     363     283     221     173     135
O     105      82      64      50      39      35      35
X     120     470     1.6
K       2       6       0       0       0       0       1
K1          7 COMBINED AND LOCAL FLOWS AT LOCK 27
K       0       3       0       0       0       0       1
K1          8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)
M       1      -1      51       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.05
U      10
O    2001    1638     844     383     174      79      36      30      25      16
X     100     200     1.6
K       1       6       0       0       0       0       1
```

```
KI      9 ROUTED FLOW E-3 TO LYONS (NODE 6)
Y      0      0      0      0      1
Y1     0      5      2
K      2      6      0      0      0      0      1
KI     10 COMBINE FLOWS AT NODE 6
K      0      4      0      0      0      0      1
KI     11 CANANDAIGUA LAKE INFLOW
M      1     -1    104      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0   1.25   0.03
U      0
O   8556   5183   3260   1307    691    316    145     30
R    300   1000    1.6
K      1      4      0      0      0      0      1
KI     12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD
Y      0      0      0      1      1
Y1     0      0      0      0      0      0  51000
Y2 10700  21300  31900  42500  53100  63700  74300  84900  95500 106100
Y2212500 319000
Y3    50     50     50     50    200    600   1000   1560   2250   3000
Y3 63000 200366
K      1      5      0      0      0      0      1
KI     13 ROUTED OUTFLOW TO FLINT CREEK MOUTH
Y      0      0      0      0      1
Y1     0     12      5
K      0      5      0      0      0      0      1
KI     14 FLINT CREEK INFLOW A-2
M      1     -1    102      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.06
U     26
O     93    534    903   1266   1367   1166    966    801    663    549
O    455    377    311    259    215    178    147    104    101     84
O     69     57     47     39     35     32
R     90   2000    1.6
K      2      5      0      0      0      0      1
KI     15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS
K      1     56      0      0      0      0      1
KI     16 OUTLET ROUTED TO LOCK 27
Y      0      0      0      0      1
Y1     0      7      3
K      0     56      0      0      0      0      1
KI     17 OUTLET LOCAL FLOW A-3
M      1     -1    155      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.6   0.06
U     22
O     91    330    905   1340   1710   2400   2601   1921   1413   1030
O    763    562    412    303    223    164    120     90     65     48
O     35     34
R    150    200    1.6
K      2     56      0      0      0      0      1
KI     18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27
K      1      6      0      0      0      0      1
KI     19 ROUTE OUTLET TO CANAL
Y      0      0      0      0      1
Y1     0      1
K      2      6      0      0      0      0      1
KI     20 COMBINE FLOW AT 6(OUTLET FLOW + E-1, E-2, E-3)
K      1      0      0      0      0      0      1
KI     21 ROUTE FLOWS AT LOCK 27 TO NODE 8
Y      0      0      0      0      1
Y1     0      0      3
K      0      7      0      0      0      0      1
KI     22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)
M      1     -1     89      0   5100      0      0      0      1
```

```
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.06
U   23
1  897  1670  1441  1144   900   721   572   454   361   207
1  227   181   143   114    90    72    57    45    36    29
1   23    23    23
I  100   360   1.6
K    1     8     0     0     0     0     1
K1      23 ROUTE FLOWS AT LOCK 26 TO NODE 8
Y    0     0     0     0     1
Y1   0     2
K    2     8     0     0     0     0     1
K1      24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8
K    1    10     0     0     0     0     1
K1      25 ROUTE FLOWS AT NODE 8 TO NODE 10
Y    0     0     0     0     1
Y1   0     5     2
K    0     9     0     0     0     0     1
K1      26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)
M    1    -1    10     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.06
U   21
1  171   304   313   246   193   152   119    93    73    50
1   45    35    20    22    17    13    11     8     6     5
1    4
I   90    90   1.6
K    1    10     0     0     0     0     1
K1      27 ROUTE INFLOW E-5 TO NODE 10
Y    0     0     0     0     1
Y1   0     2
K    2    10     0     0     0     0     1
K1      28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10
K    1    15     0     0     0     0     1
K1      29 ROUTE FLOWS AT NODE 10 TO NODE 15
Y    0     0     0     0     1
Y1   0     5     2
K    0    11     0     0     0     0     1
K1      30 LOCAL INFLOW B-1 INTO KEUKA LAKE
M    1    -1   103     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0  1.50  0.03
U    6
1 14210  3342  1273   403   103     0
I  100   800   1.6
K    1    11     0     0     0     0     1
K1      31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS
Y    0     0     0     1     1
Y1   0     0     0     0     0     0 147000
Y2107000 129500 141000 153500 172000 170000 191000 204000 217000
Y2320550
Y3  120   320   445   530   575   670   890  1130  1470
Y3126000
K    1    12     0     0     0     0     1
K1      32 ROUTE KEUKA LAKE OUTFLOWS TO 12
Y    0     0     0     0     1
Y1   0     6     2
K    0    12     0     0     0     0     1
K1      33 SENECA LAKE INFLOWS B-2
M    1    -1   524     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.03
U   12
1 26993 10031  6099  4332  2720  1700  1072   673   422   266
1  167    70
I  500  2000   1.6
```

AD-A077 447 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. LOWER FULTON DAM (GRANBY)(INVENTOR--ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

UNCLASSIFIED NL

2 OF 2
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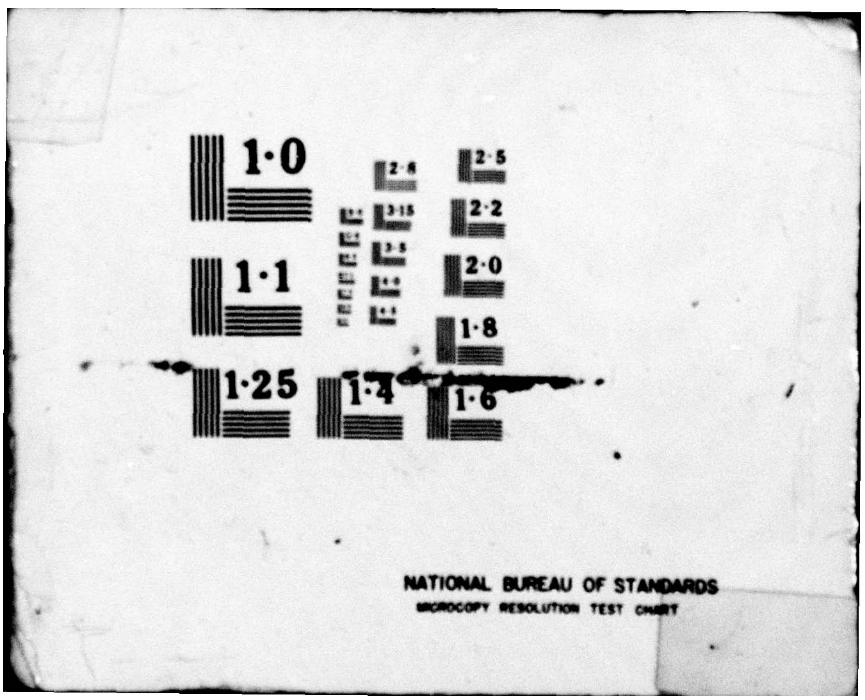
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NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

```
K       2      12       0       0       0       0       1
K1        34 COMBINE LOCAL FLOW B-2 AND ROUTED KEUKA LAKE OUTLET FLOWS
K       1      12       0       0       0       0       1
K1        35 SENECA LAKE OUTFLOWS - MODIFIED  PULS METHOD
Y       0       0       0       1       1
Y1                                             534000
Y2372000  414000  456000  500000  543000  586000  630000  650000  674000  720000
Y2800000 1200000
Y3    700     700     700     700     700     700     700    1000    3000    3000
Y3  15000   77000
K       1      13       0       0       0       0       1
K1        36 SENECA LAKE OUTFLOWS ROUTED TO 13
Y       0       0       0       0       1
Y1      0       2
K       0      13       0       0       0       0       1
K1        37 LOCAL INFLOW B-4
M       1      -1      39       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.05
U      15
1     539    1094     796     549     370     260     179     123      85      58
1      40      28      19      11      11
1      92     200     1.6
K       2      13       0       0       0       0       1
K1        38 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4
K       1      14       0       0       0       0       1
K1        39 ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)
Y       0       0       0       0       1
Y1      0       6       2
K       0      14       0       0       0       0       1
K1        40 LOCAL INFLOW B-5
M       1      -1      36       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.05
U      12
1     895    1094     692     437     277     175     110      70      44      28
1      14      10
1      92     200     1.6
K       2      14       0       0       0       0       1
K1        41 COMBINE FLOW B-5 WITH ROUTED FLOW
K       0      14       0       0       0       0       1
K1        42 CAYUGA LAKE INFLOW B-3
M       1      -1     702       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.03
U      15
1   24903   15540   13526    9524    6529    4476    3069    2104    1443     989
1     678     465     319     219      81
1    1000    1700     1.6
K       2      14       0       0       0       0       1
K1        43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW
K       1      14       0       0       0       0       1
K1        44 CAYUGA LAKE OUTFLOW - MODIFIED PULS
Y       0       0       0       1       1
Y1      0       0       0       0       0       0  490000
Y2373000  417000  460000  503000  546000  589500  634000  660000  727000
Y2854500  982000
Y3   1700    1700    1700    1700    3400    3400    3400    8700    8700
Y3  30510  103500
K       1      15       0       0       0       0       1
K1        45 ROUTE CAYUGA LAKE OUTFLOWS TO NODE 15
Y       0       0       0       0       1
Y1      0       3       1
K       2      15       0       0       0       0       1
K1        46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15
K       1      18       0       0       0       0       1
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K1      47 ROUTE FLOWS TO NODE 10
Y     0     0     0     0     1
Y1    0     0     3
K     0    16     0     0     0     0     1
K1      48 LOCAL FLOW E-6
M     1    -1   191     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
W    16
O  3051  5102  3130  2469  1710  1175   800   555   301   262
O   100   123    85    75    70    27
X   140   400   1.6
K     1    10     0     0     0     0     1
K1      49 ROUTE LOCAL FLOW E-6 TO NODE 10
Y     0     0     0     0     1
Y1    0     2
K     2    10     0     0     0     0     1
K1      50 COMBINE ROUTED FLOW W/ FLOW AT NODE 10
K     0    17     0     0     0     0     1
K1      51 HEAD OWASCO INFLOW C-1
M     1    -1   201     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.75   .05
W    10
O  6633  5070  4200  2273  1200   633   334   176    93    30
X   450  1000   1.6
K     1    17     0     0     0     0     1
K1      52 OWASCO LAKE INFLOWS - MODIFIED PULS METHOD
Y     0     0     0     1     1
Y1    0     0     0     0     0     0 92000
Y2 66000  73200  79900  86500  93200  99800 106500 113200 119800 126500
Y2152900 205700
Y3  600   600   600  1100  1700  2300  2860  3400  3400  3400
Y3 24000  69100
K     1    10     0     0     0     0     1
K1      53 ROUTE OWASCO LAKE OUTLET FLOWS
Y     0     0     0     0     1
Y1    0     7     3
K     2    10     0     0     0     0     1
K1      54 COMBINE FLOWS WITH FLOWS AT NODE 10
K     0    10     0     0     0     0     1
K1      55 REAP LOCAL FLOW C-6
M     1    -1    19     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
W    10
O   157   360   352   260   205   156   119    91    70    53
O    40    26    23    18    14    10     8     6
X    90   200   1.6
K     2    10     0     0     0     0     1
K1      56 COMBINE  LOCAL FLOW C-6 WITH FLOW AT NODE 10
K     1    21     0     0     0     0     1
K1      57 ROUTE FLOW AT 10 TO NODE 21
Y     0     0     0     0     1
Y1    0     7     3
K     0    19     0     0     0     0     1
K1      58 LOCAL INFLOW E-7
M     1    -1    90     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
W    11
O  2769  3130  1870  1115   664   396   236   141    84    50
O    19
X   120   400   1.6
K     1    21     0     0     0     0     1
K1      59 ROUTE LOCAL FLOW TO NODE 21
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Y       0       0       0       0       1
Y1      0       6       2
K       2      21       0       0       0       0       1
K1         60 COMBINE ROUTED FLOW WITH FLOW AT 21
K       0      20       0       0       0       0       1
K1         61 SKANEATELES LAKE INFLOWS
M       1      -1      74       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0    0.75    0.05
U       5
1    6039     791     232      56      10
X     250     500     1.6
K       1      20       0       0       0       0       1
K1         62 SKANEATELES LAKE OUTFLOWS
Y       0       0       0       1       1
Y1      0       0       0       0       0       0       0
Y2      0   17323   34756   52104  104368  208736  243492
Y3      0     353     747    1500    6403   13313   17359
K       1      21       0       0       0       0       1
K1         63 ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21
Y       0       0       0       0       1
Y1      0       6       2
K       2      21       0       0       0       0       1
K1         64 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE 21
K       0      21       0       0       0       0       1
K1         65 LOCAL FLOW C-7
M       1      -1      27       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.06
U      11
1     496     946     501     351     212     127      77      46      28      17
1       7
X      90     200     1.6
K       2      21       0       0       0       0       1
K1         66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE 21
K       1      22       0       0       0       0       1
K1         67 ROUTING TO NODE 22
Y       0       0       0       0       1
Y1      0       4       1
K       0      22       0       0       0       0       1
K1         68  LOCAL FLOW E-8
M       1      -1      98       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.06
U       7
1    4007    3059    1402     642     239     135      42
X     120     400     1.6
K       2      22       0       0       0       0       1
K1         69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22
K       1      22       0       0       0       0       1
K1         70 BALDWINSVILLE POOL - MODIFIED PULS METHOD
Y       0       0       0       1       1
Y1      0       0       0       0       0       0    3250
Y2   3250    5000    8400   10000   11700   14000   17000   20000   24000   30000
Y3   3000    4000    6000    8000   10000   12000   14000   15300   16600   17000
K       1      26       0       0       0       0       1
K1         71 ROUTE FLOW TO NODE 26
Y       0       0       0       0       1
Y1      0       4       1
K       0      23       0       0       0       0       1
K1         72 INFLOW TO OTISCO LAKE C-3
M       1      -1    42.7       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0    0.75    0.05
U       6
1    3092     913     397     139      55       9
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X     90   300   1.6
K      1    23     0     0     0     0     1
K1       73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD
Y      0     0     0     1     1
Y1     0     0     0     0     0     0 29300
Y2 19600 21000 23900 26100 28300 30500 32600 34000 37000 39200
Y2 45700 52300 58000 65300
Y3   200   200   200   200   200   400   900  1600  2000  2000
Y3  7060 10100 33700 53200
K      1    25     0     0     0     0     1
K1       74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25
Y      0     0     0     0     1
Y1     0    10     4
K      0    24     0     0     0     0     1
K1       75 INFLOW INTO ONONDAGA RESERVOIR   C-4
M      1    -1    60     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0   1.5  0.06
U      6
O   2010  3341  1250   435   151    57
X    250   300   1.6
K      1    24     0     0     0     0     1
K1       76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD
Y      0     0     0     1     1
Y1     0     0     0     0     0     0     0
Y2     0   100   700  1900  3500  7940 10200 22200 27000 32500
Y2 43400 52300 62200 72100
Y3    80   430   660   800  1070  1420  1770  1040  2000  2000
Y3  6200 15400 20400 44700
K      1    25     0     0     0     0     1
K1       77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25
Y      0     0     0     0     1
Y1     0     0     3
K      2    25     0     0     0     0     1
K1       78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25
K      0    25     0     0     0     0     1
K1       79 LOCAL INFLOW C-5
M      1    -1   102     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0  1.25  0.06
U     11
O   2671  3269  2030  1215   727   436   261   156    77    56
O     27
X    250   500   1.6
K      2    25     0     0     0     0     1
K1       80 COMBINE ROUTED FLOWS, LOCAL INFLOW
K      0    25     0     0     0     0     1
K1       81 LOCAL FLOW C-8
M      1    -1    72     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0   1.0   .06
U     14
O    459  1455  1854  1454   926   590   376   239   152    97
O     62    39    25    12
X    250   300   1.6
K      2    25     0     0     0     0     1
K1       82 COMBINE LOCAL FLOW AT NODE 25
K      1    26     0     0     0     0     1
K1       83 ROUTE FLOWS TO NODE 26
Y      0     0     0     0     1
Y1     0     0     3
K      2    26     0     0     0     0     1
K1       84 COMBINE ROUTED FLOW AND FLOW AT NODE 26
K      1    28     0     0     0     0     1
K1       85 ROUTE FLOWS TO NODE 28 (THREE RIVERS)
Y      0     0     0     0     1
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Y1    0     6     2
K     0    27     0     0     0     0     1
K1       86 LOCAL FLOW  (E-9)  AT NODE 27
M     1    -1    37     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U     6
I  2140  1119   437   171    67    11
X   100   150   1.6
K     1    28     0     0     0     1
K1       87 ROUTE LOCAL FLOW E-9 TO NODE 28
Y     0     0     0     0     1
Y1    0     3     1
K     2    28     0     0     0     0     1
K1       88 COMBINE HYDROGRAPHS AT 28
K     0    29     0     0     0     0     1
K1       89 INFLOWS TO BARGE CANAL FROM EASTERN END OF BASIN   (C-2)
M    -1     0   100     0  5100     0     0     0     1
M
M
M
M
K     1    30     0     0     0     0     1
K1       90 ROUTE FLOW AT NODE 29 TO NODE 30
Y     0     0     0     0     1
Y1    0     7     3
K     0    30     0     0     0     0     1
K1       91 LOCAL INFLOW D-4
M     1    -1   529     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    15
I   940  4797 11090 12700 10200  6513  4014  2473  1524   939
I   579   356   220   140   102
X   800  3960   1.6
K     2    30     0     0     0     0     1
K1       92 COMBINE LOCAL FLOW WITH ROUTED FLOW
K     1    31     0     0     0     0     1
K1       93 ROUTE FLOWS TO NODE 31
Y     0     0     0     0     1
Y1    0     1
K     0    31     0     0     0     0     1
K1       94 LOCAL FLOW D-3
M     1    -1   144     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    24
I   376  1076  2155  2396  2356  1742  1289   953   705   522
I   386   286   183   154   115    85    63    47    34    30
I    30    30    30    24
X   320  1000   2.0
K     2    31     0     0     0     0     1
K1       95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31
K     0    31     0     0     0     0     1
K1       96 LOCAL FLOW D-2
M     1    -1   105     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    14
I   353  1062  2750  2357  1404   929   501   363   227   142
I    89    49    35    18
X   240   800   1.6
K     2    31     0     0     0     0     1
K1       97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31
K     0    31     0     0     0     0     1
K1       98 LOCAL FLOW D-1
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M      1    -1   200      0  5100      0      0      0      1
P      0  21.5    33     47    55     65     72     74
T      0     0     0      0     0      0   0.25   0.06
U     24
I    103   504  1042   1512  2516   3750   4112   4139   3602   2645
I   1916  1204   866    727   527    320    276    200    145    105
I     76    55    50     50
I    600  2160   1.6
K      2    31     0      0     0      0      1
K1       99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31
K      0    31     0      0     0      0      1
K1       100 LOCAL FLOW D-5
M      1    -1   269      0  5100      0      0      0      1
P      0  21.5    33     47    55     65     72     74
T      0     0     0      0     0      0   0.25   0.05
U     12
I  12227  5035  4245   2505  1574    950    503    355    216    132
I     80    36
I    540  2000   1.6
K      2    31     0      0     0      0      1
K1       101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31
K      1    31     0      0     0      0      1
K1       102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD
Y      0     0     0      1     1
Y1     0     0     0      0     0      0 670000
Y2442000 635000 640000 650000 680000 735000 806000 845000
Y2990000 1150000 1300000
Y3  1000  1000  2000   4000  6000   8000  10000  11000
Y3 27900  64700 116600
K      1    32     0      0     0      0      1
K1       103 ROUTE FLOWS TO NODE 32
Y      0     0     0      0     1
Y1     0     1
K      0    32     0      0     0      0      1
K1       104 LOCAL FLOW D-6
M      1    -1    20      0  5100      0      0      0      1
P      0  21.5    33     47    55     65     72     74
T      0     0     0      0     0      0    0.5   0.06
U     15
I    274   531   601    491   330    233    160    110     76     53
I     36    25    18     12     7
I     70   210   1.6
K      2    32     0      0     0      0      1
K1       105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32
K      1    28     0      0     0      0      1
K1       106 ROUTE FLOW AT 32 TO NODE 28
Y      0     0     0      0     1
Y1     0     6     2
K      2    28     0      0     0      0      1
K1       107 COMBINE ROUTED FLOW WITH FLOW AT NODE 28
K      0    28     0      0     0      0      1
K1       108 LOCAL FLOW D-7
M      1    -1   110      0  5100      0      0      0      1
P      0  21.5    33     47    55     65     72     77
T      0     0     0      0     0      0    0.5   0.06
U     24
I    602  1403  1800   1872  1496   1127    849    536    402    363
I    273   204   155    117    88     67     50     38     28     22
I     20    20    20      0
I    250   800   2.0
K      2    28     0      0     0      1      1
K1       109 COMBINE WITH FLOW AT NODE 28
K      1    33     0      0     0      1      1
K1       110 ROUTE FLOW AT 28 TO NODE 33
Y      0     0     0      0     1
Y1     0     3     1
```

```
DBOUT      14:31 JUN 27,'79

1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
 **********************************
1                                PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                         RUNOFF HYDROGRAPH AT            1
                                         ROUTE HYDROGRAPH TO             2
                                         RUNOFF HYDROGRAPH AT            2
                                         COMBINE  2 HYDROGRAPHS AT       2
                                         ROUTE HYDROGRAPH TO             6
                                         RUNOFF HYDROGRAPH AT            6
                                         COMBINE  2 HYDROGRAPHS AT       6
                                         RUNOFF HYDROGRAPH AT            3
                                         ROUTE HYDROGRAPH TO             6
                                         COMBINE  2 HYDROGRAPHS AT       6
                                         RUNOFF HYDROGRAPH AT            4
                                         ROUTE HYDROGRAPH TO             4
                                         ROUTE HYDROGRAPH TO             5
                                         RUNOFF HYDROGRAPH AT            5
                                         COMBINE  2 HYDROGRAPHS AT       5
                                         ROUTE HYDROGRAPH TO            56
                                         RUNOFF HYDROGRAPH AT           56
                                         COMBINE  2 HYDROGRAPHS AT      56
                                         ROUTE HYDROGRAPH TO             6
                                         COMBINE  2 HYDROGRAPHS AT       4
                                         ROUTE HYDROGRAPH TO             8
                                         RUNOFF HYDROGRAPH AT            7
                                         ROUTE HYDROGRAPH TO             8
                                         COMBINE  2 HYDROGRAPHS AT       8
                                         ROUTE HYDROGRAPH TO            10
                                         RUNOFF HYDROGRAPH AT            9
                                         ROUTE HYDROGRAPH TO            10
                                         COMBINE  2 HYDROGRAPHS AT      10
                                         ROUTE HYDROGRAPH TO            15
                                         RUNOFF HYDROGRAPH AT           11
                                         ROUTE HYDROGRAPH TO            11
                                         ROUTE HYDROGRAPH TO            12
                                         RUNOFF HYDROGRAPH AT           12
                                         COMBINE  2 HYDROGRAPHS AT      12
                                         ROUTE HYDROGRAPH TO            12
                                         ROUTE HYDROGRAPH TO            13
                                         RUNOFF HYDROGRAPH AT           13
                                         COMBINE  2 HYDROGRAPHS AT      13
                                         ROUTE HYDROGRAPH TO            14
                                         RUNOFF HYDROGRAPH AT           14
                                         COMBINE  2 HYDROGRAPHS AT      14
                                         RUNOFF HYDROGRAPH AT           14
                                         COMBINE  2 HYDROGRAPHS AT      14
                                         ROUTE HYDROGRAPH TO            14
                                         ROUTE HYDROGRAPH TO            15
                                         COMBINE  2 HYDROGRAPHS AT      15
                                         ROUTE HYDROGRAPH TO            16
                                         RUNOFF HYDROGRAPH AT           16
                                         ROUTE HYDROGRAPH TO            18
                                         COMBINE  2 HYDROGRAPHS AT      18
                                         RUNOFF HYDROGRAPH AT           17
                                         ROUTE HYDROGRAPH TO            17
                                         ROUTE HYDROGRAPH TO            18
                                         COMBINE  2 HYDROGRAPHS AT      18
                                         RUNOFF HYDROGRAPH AT           18
```

```
COMBINE  2 HYDROGRAPHS AT      [illegible]
ROUTE HYDROGRAPH TO            21
RUNOFF HYDROGRAPH AT           19
ROUTE HYDROGRAPH TO            21
COMBINE  2 HYDROGRAPHS AT      21
RUNOFF HYDROGRAPH AT           20
ROUTE HYDROGRAPH TO            20
ROUTE HYDROGRAPH TO            21
COMBINE  2 HYDROGRAPHS AT      21
RUNOFF HYDROGRAPH AT           21
COMBINE  2 HYDROGRAPHS AT      21
ROUTE HYDROGRAPH TO            22
RUNOFF HYDROGRAPH AT           22
COMBINE  2 HYDROGRAPHS AT      22
ROUTE HYDROGRAPH TO            22
ROUTE HYDROGRAPH TO            26
RUNOFF HYDROGRAPH AT           23
ROUTE HYDROGRAPH TO            23
ROUTE HYDROGRAPH TO            25
RUNOFF HYDROGRAPH AT           24
ROUTE HYDROGRAPH TO            24
ROUTE HYDROGRAPH TO            25
COMBINE  2 HYDROGRAPHS AT      25
RUNOFF HYDROGRAPH AT           25
COMBINE  2 HYDROGRAPHS AT      25
RUNOFF HYDROGRAPH AT           25
COMBINE  2 HYDROGRAPHS AT      25
ROUTE HYDROGRAPH TO            26
COMBINE  2 HYDROGRAPHS AT      26
ROUTE HYDROGRAPH TO            28
RUNOFF HYDROGRAPH AT           27
ROUTE HYDROGRAPH TO            28
COMBINE  2 HYDROGRAPHS AT      28
RUNOFF HYDROGRAPH AT           29
ROUTE HYDROGRAPH TO            30
RUNOFF HYDROGRAPH AT           30
COMBINE  2 HYDROGRAPHS AT      30
ROUTE HYDROGRAPH TO            31
RUNOFF HYDROGRAPH AT           31
COMBINE  2 HYDROGRAPHS AT      31
RUNOFF HYDROGRAPH AT           31
COMBINE  2 HYDROGRAPHS AT      31
RUNOFF HYDROGRAPH AT           31
COMBINE  2 HYDROGRAPHS AT      31
RUNOFF HYDROGRAPH AT           31
COMBINE  2 HYDROGRAPHS AT      31
ROUTE HYDROGRAPH TO            31
ROUTE HYDROGRAPH TO            32
RUNOFF HYDROGRAPH AT           32
COMBINE  2 HYDROGRAPHS AT      32
ROUTE HYDROGRAPH TO            28
COMBINE  2 HYDROGRAPHS AT      28
RUNOFF HYDROGRAPH AT           28
COMBINE  2 HYDROGRAPHS AT      28
ROUTE HYDROGRAPH TO            33
END OF NETWORK
```

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
**********************************

RUN  DATE# 79/06/27.
     TIME# 13.35.35.
```

OSWEGO RIVER BASIN
HEC1DB
PMF- OVERFLOW ANALYSIS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
40	6	0	0	0	0	0	0	4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1
RTIOS= .20 .40 .50 .60 .80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

1 BARGE CANAL LOCK 30 AT MACEDON (SUB AREA A1)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

3 GANARGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	147.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE PMS R6 R12 R24 R48 R72 R96
0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00
TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA
STRTQ= 140.00 QRCSN= 550.00 RTIOR= 1.60

0
END-OF-PERIOD FLOW
MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.84 11.56 3.30 186787.
(377.)(294.)(84.)(5289.22)

********* ********* ********* ********* *********

COMBINE HYDROGRAPHS

4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	2	0	0	0	0	1	0	0

********* ********* ********* ********* *********

HYDROGRAPH ROUTING

5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	3	0.000	0.000	0.000	0.	0

********* ********* ********* ********* *********

SUB-AREA RUNOFF COMPUTATION

6 LOWER CANANDAIGUA LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	110.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 120.00 QRCSN= 470.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.56	3.30	147318.
										(377.)	(294.)	(84.)	(4171.58)

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

7 COMBINED AND LOCAL FLOWS AT LOCK 27

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	51.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 100.00 QRCSN= 200.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.56	3.30	65053.
										(377.)	(294.)	(84.)	(1842.10)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

9 ROUTED FLOW E-3 TO LYONS (NODE 6)

```
                  ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                      6      1      0      0      0      0      1      0      0
                                    ROUTING DATA
           QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
             0.0  0.000   0.00      0      1      0      0             0

                  NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                      0      5      2  0.000  0.000  0.000     0.      0


   **********     **********     **********     **********     **********

                                 COMBINE HYDROGRAPHS

           10 COMBINE FLOWS AT NODE 6

                  ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                      6      2      0      0      0      0      1      0      0


   **********     **********     **********     **********     **********

                              SUB-AREA RUNOFF COMPUTATION

           11 CANANDAIGUA LAKE INFLOW

                  ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                      4      0      0      0      0      0      1      0      0

                                  HYDROGRAPH DATA
         IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
             1     -1 104.00   0.00 5100.00  0.00  0.000      0      1      0

                                    PRECIP DATA
                SPFE    PMS     R6    R12    R24    R48    R72    R96
                0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                     LOSS DATA
        LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
            0   0.00   0.00   1.00   0.00   0.00   1.00   1.25    .03   0.00   0.00

                                  RECESSION DATA
                        STRTQ=  300.00   QRCSN= 1000.00   RTIOR= 1.60

      0                           END-OF-PERIOD FLOW
 MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q    MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                              SUM  14.06  12.00   2.06  252691.
                                                                 ( 377.)( 305.)(  73.)( 715[illegible].41)


   **********     **********     **********     **********     **********

                                 HYDROGRAPH ROUTING

           12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD

                  ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                      4      1      0      0      0      0      1      0      0
                                    ROUTING DATA
```

```
                   QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                     0.0  0.000   0.00      1      1      0      0             0

                          NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                              0      0      0  0.000  0.000  0.000 51000.      0

STORAGE    10700.00   21300.00   31900.00   42500.00   53100.00   63700.00   74300.00   84900.00   95500.00  106100.00
          212300.00  319000.00

OUTFLOW       50.00      50.00      50.00      50.00     200.00     600.00    1000.00    1560.00    2250.00    3000.00
           63000.00  200344.00


         **********          **********          **********          **********          **********

                                            HYDROGRAPH ROUTING

                   13 ROUTED OUTFLOW TO FLINT CREEK MOUTH

                          ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                              5      1      0      0      0      0      1      0      0
                                              ROUTING DATA
                   QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                     0.0  0.000   0.00      0      1      0      0             0

                          NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                              0     12      5  0.000  0.000  0.000     0.      0


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'' ,   P ', '                        SUB-AREA RUNOFF COMPUTATION

                   14 FLINT CREEK INFLOW A-2

                          ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                              5      0      0      0      0      0      1      0      0

                                             HYDROGRAPH DATA
                 IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
                     1     -1 102.00   0.00 5100.00  0.00  0.000      0      1      0

                                               PRECIP DATA
                        SPFE    PMS     R6    R12    R24    R48    R72    R96
                        0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                LOSS DATA
              LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
                  0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                                              RECESSION DATA
                              STRTQ=   90.00   QRCSN= 2000.000   RTIOR= 1.60

         0                                 END-OF-PERIOD FLOW
       MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                         SUM  14.86  11.08   3.78   133487.
                                                                            ( 377.)( 281.)(  96.)( 377*.93)


         **********          **********          **********          **********          **********
```

COMBINE HYDROGRAPHS

15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	2	0	0	0	0	1	0	0

**********   **********   **********   **********   **********

HYDROGRAPH ROUTING

16 OUTLET ROUTED TO LOCK 27

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
56	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

**********   **********   **********   **********   **********

SUB-AREA RUNOFF COMPUTATION

17 OUTLET LOCAL FLOW A-3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
56	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	155.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.60	.06	0.00	0.00

RECESSION DATA

STRTQ= 150.00   QRCSN= 200.00   RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q   MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.06 3.80 187176.
(377.)(281.)(97.)(5300.23)

**********   **********   **********   **********   **********

COMBINE HYDROGRAPHS

18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27

```
                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                    56      2      0      0      0      0      1      0      0


**********       **********       **********       **********       **********

                              HYDROGRAPH ROUTING

        19 ROUTE OUTLET TO CANAL

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                     6      1      0      0      0      0      1      0      0
                                   ROUTING DATA
          QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
            0.0  0.000   0.00      0      1      0      0             0

                 NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                     0      1      0  0.000  0.000  0.000     0.      0


**********       **********       **********       **********       **********

                              COMBINE HYDROGRAPHS

        20 COMBINE FLOW AT 6(OUTLET FLOW + E-1, E-2, E-3)

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                     6      2      0      0      0      0      1      0      0


**********       **********       **********       **********       **********

                              HYDROGRAPH ROUTING

        21 ROUTE FLOWS AT LOCK 27 TO NODE 8

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                     8      1      0      0      0      0      1      0      0
                                   ROUTING DATA
          QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
            0.0  0.000   0.00      0      1      0      0             0

                 NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                     0      0      3  0.000  0.000  0.000     0.      0


**********       **********       **********       **********       **********

                            SUB-AREA RUNOFF COMPUTATION

        22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                     7      0      0      0      0      0      1      0      0

                                 HYDROGRAPH DATA
      IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
          1     -1  89.00   0.00 5100.00   0.00  0.000      0      1      0

                                   PRECIP DATA
            SPFE    PMS     R6    R12    R24    R48    R72    R96
      [illegible]
```

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 100.00 QRCSN= 340.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.84 11.08 3.78 109181.
(377.)(281.)(96.)(3091.66)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

23 ROUTE FLOWS AT LOCK 26 TO NODE 8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	0	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

25 ROUTE FLOWS AT NODE 8 TO NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	0	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	5	2	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

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                         SUB-AREA RUNOFF COMPUTATION

           26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)

                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         9       0       0       0       0       0       1       0       0

                                     HYDROGRAPH DATA
              IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1      -1   10.00    0.00 5100.00    0.00   0.000       0       1       0

                                       PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS .934

                                        LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .06    0.00    0.00

                                      RECESSION DATA
                           STRTQ=   90.00   QRCSN=   90.00   RTIOR= 1.60

      0                             END-OF-PERIOD FLOW
  MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS   COMP Q

                                                                 SUM  14.86  11.08   3.78   23275.
                                                                     ( 377.)( 281.)(  96.)( 659.07)


          *********       *********       *********       *********       *********

                                     HYDROGRAPH ROUTING

           27 ROUTE INFLOW E-5 TO NODE 10

                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        10       1       0       0       0       0       1       0       0
                                       ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0   0.000    0.00       0       1       0       0               0

                     NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                         0       2       0   0.000   0.000   0.000      0.       0


          *********       *********       *********       *********       *********

                                    COMBINE HYDROGRAPHS

           28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10

                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        10       2       0       0       0       0       1       0       0


          *********       *********       *********       *********       *********

                                     HYDROGRAPH ROUTING

           29 ROUTE FLOWS AT NODE 10 TO NODE 15
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```
                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      15       1       0       0       0       0       1       0       0
                                         ROUTING DATA
            QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
              0.0   0.000    0.00       0       1       0       0               0

                   NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                       0       5       2   0.000   0.000   0.000      0.       0


    **********       **********       **********       **********       **********

                                  SUB-AREA RUNOFF COMPUTATION

          30 LOCAL INFLOW B-1 INTO KEUKA LAKE

                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      11       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
      IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
          1      -1  183.00    0.00 5100.00    0.00   0.000       0       1       0

                                          PRECIP DATA
                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                    0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                           LOSS DATA
       LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
           0   0.00   0.00   1.00   0.00   0.00   1.00   1.50    .03   0.00   0.00

                                         RECESSION DATA
                        STRTQ=  100.00   QRCSN=  800.00   RTIOR= 1.60

     0                                  END-OF-PERIOD FLOW
   MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                     SUM  14.06  11.79   3.07  242812.
                                                                        ( 377.)( 299.)(  78.)( 6875.67)


    **********       **********       **********       **********       **********

                                       HYDROGRAPH ROUTING

          31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS

                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      11       1       0       0       0       0       1       0       0
                                         ROUTING DATA
            QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
              0.0   0.000    0.00       1       1       0       0               0

                   NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                       0       0       0   0.000   0.000   0.000 147000.       0

STORAGE    107000.00  129500.00  141000.00  153500.00  172000.00  178000.00  191000.00  204000.00  217040.00       0.00
           320550.00

OUTFLOW       120.00     320.00     445.00     530.00     575.00     670.00     890.00    1130.00    1470.00       0.00
           126000.00
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**********          **********          **********          **********          **********

                                        HYDROGRAPH ROUTING

            32 ROUTE KEUKA LAKE OUTFLOWS TO 12

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         12       1       0       0       0       0       1       0       0
                                            ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0   0.000    0.00       0       1       0       0               0

                      NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                          0       6       2   0.000   0.000   0.000      0.       0


**********          **********          **********          **********          **********

                                     SUB-AREA RUNOFF COMPUTATION

            33 SENECA LAKE INFLOWS B-2

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         12       0       0       0       0       0       1       0       0

                                            HYDROGRAPH DATA
              IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1      -1  524.00    0.00 5100.00    0.00   0.000       0       1       0

                                             PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                              LOSS DATA
              LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                  0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .03    0.00    0.00

                                            RECESSION DATA
                              STRTQ=  500.00   QRCSN= 2000.00   RTIOR= 1.60

       0                                   END-OF-PERIOD FLOW
   MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                       SUM  14.86  12.52   2.34  741190.
                                                                          ( 377.)( 318.)(  59.)(21007.99)


**********          **********          **********          **********          **********

                                         COMBINE HYDROGRAPHS

            34 COMBINE LOCAL FLOW B-2 AND ROUTED KEUKA LAKE OUTLET FLOWS

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         12       2       0       0       0       0       1       0       0


**********          **********          **********          **********          **********

                                         HYDROGRAPH ROUTING
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                                       HYDROGRAPH ROUTING

                     35 SENECA LAKE OUTFLOWS - MODIFIED  PULS METHOD

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 12       1       0       0       0       0       1       0       0
                                                 ROUTING DATA
                     QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                       0.0    0.000    0.00       1       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  0       0       0   0.000   0.000   0.000 534000.       0

STORAGE   372000.00   414000.00   456000.00   500000.00   543000.00   586000.00   630000.00   650000.00   674000.00   720000.00
          800000.00  1200000.00

OUTFLOW      700.00      700.00      700.00      700.00      700.00      700.00      700.00     1000.00     3000.00     3000.00
           15000.00    77000.00


          **********          **********          **********          **********          **********

                                              HYDROGRAPH ROUTING

                     36 SENECA LAKE OUTFLOWS ROUTED TO 13

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 13       1       0       0       0       0       1       0       0
                                                 ROUTING DATA
                     QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                       0.0    0.000    0.00       0       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  0       2       0   0.000   0.000   0.000      0.       0


          **********          **********          **********          **********          **********

                                           SUB-AREA RUNOFF COMPUTATION

                     37 LOCAL INFLOW 8-4

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 13       0       0       0       0       0       1       0       0

                                                HYDROGRAPH DATA
                   IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                       1      -1   39.00    0.00 5100.00    0.00   0.000       0       1       0

                                                  PRECIP DATA
                            SPFE     PMS      R6     R12     R24     R48     R72     R96
                            0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                   LOSS DATA
                LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                    0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .05    0.00    0.00

                                                 RECESSION DATA
                               STRTQ=   92.00   QRCSN=  200.00   RTIOR=  1.60

      0                                       END-OF-PERIOD FLOW
   MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q
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                                                              SUM  14.06  11.56   3.30    51530.
                                                                  ( 377.)( 294.)(  84.)( 1459.17)


        **********      **********      **********      **********      **********

                                    COMBINE HYDROGRAPHS

             30 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW D-4

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       13       2       0       0       0       0       1       0       0


        **********      **********      **********      **********      **********

                                    HYDROGRAPH ROUTING

             39 ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       14       1       0       0       0       0       1       0       0
                                        ROUTING DATA
             QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
               0.0   0.000    0.00       0       1       0       0               0

                    NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                        0       6       2   0.000   0.000   0.000      0.       0


        **********      **********      **********      **********      **********

                                 SUB-AREA RUNOFF COMPUTATION

             40 LOCAL INFLOW D-5

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       14       0       0       0       0       0       1       0       0

                                       HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1      -1   36.00    0.00 5100.00    0.00   0.000       0       1       0

                                         PRECIP DATA
                  SPFE     PMS      R6     R12     R24     R48     R72     R96
                  0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                          LOSS DATA
         LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
             0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .05    0.00    0.00

                                        RECESSION DATA
                        STRTQ=    92.00    QRCSN=   200.00    RTIOR= 1.60

     0                                END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                              SUM  14.06  11.56   3.30    47972.
                                                                  ( 377.)( 294.)(  84.)( 1356.42)
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**********   **********   **********   **********   **********

COMBINE HYDROGRAPHS

41 COMBINE FLOW B-5 WITH ROUTED FLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	2	0	0	0	0	1	0	0

**********   **********   **********   **********   **********

SUB-AREA RUNOFF COMPUTATION

42 CAYUGA LAKE INFLOW B-3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	702.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.03	0.00	0.00

RECESSION DATA

STRTQ= 1000.00   QRCSN= 1700.00   RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	12.52	2.34	1001195.
										(377.)	(318.)	(59.)	(30616.03)

**********   **********   **********   **********   **********

COMBINE HYDROGRAPHS

43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	2	0	0	0	0	1	0	0

**********   **********   **********   **********   **********

HYDROGRAPH ROUTING

44 CAYUGA LAKE OUTFLOW - MODIFIED PULS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	1	0	0	0	0	1	0	0

```
                                   ROUTING DATA
              QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                0.0  0.000   0.00      1      1      0      0             0

                     NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                         0      0      0  0.000  0.000  0.000 490000.      0

STORAGE  375000.00  417000.00  460000.00  503000.00  546000.00  589500.00  634000.00  680000.00  727000.00      0.00
         854500.00  902000.00

OUTFLOW    1700.00    1700.00    1700.00    1700.00    3400.00    3400.00    3400.00    8700.00    8700.00      0.00
          30510.00  103500.00


         **********       **********       **********       **********       **********

                                  HYDROGRAPH ROUTING

              45 ROUTE CAYUGA LAKE OUTFLOWS TO NODE 15

                     ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                        15      1      0      0      0      0      1      0      0
                                   ROUTING DATA
              QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                0.0  0.000   0.00      0      1      0      0             0

                     NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                         0      3      1  0.000  0.000  0.000     0.      0


         **********       **********       **********       **********       **********

                                  COMBINE HYDROGRAPHS

              46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15

                     ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                        15      2      0      0      0      0      1      0      0


         **********       **********       **********       **********       **********

                                  HYDROGRAPH ROUTING

              47 ROUTE FLOWS TO NODE 10

                     ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                        10      1      0      0      0      0      1      0      0
                                   ROUTING DATA
              QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                0.0  0.000   0.00      0      1      0      0             0

                     NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                         0      0      3  0.000  0.000  0.000     0.      0


         **********       **********       **********       **********       **********

                                SUB-AREA RUNOFF COMPUTATION

              48 LOCAL FLOW E-6
```

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
16	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	191.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 140.00 QRCSN= 400.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.00 3.78 227590.
(377.)(281.)(96.)(6444.63)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

49 ROUTE LOCAL FLOW E-6 TO NODE 18

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

51 HEAD QUASCO INFLOW C-1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
17	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

```
          IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
              1     -1 201.00   0.00 5100.00  0.00  0.000      0      1      0

                                     PRECIP DATA
                  SPFE    PMS     R6    R12    R24    R48    R72    R96
                  0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                     LOSS DATA
        LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
            0   0.00   0.00   1.00   0.00   0.00   1.00    .75    .05   0.00   0.00

                                   RECESSION DATA
                      STRTQ=  450.00   QRCSN= 1000.00   RTIOR= 1.60

       0                             END-OF-PERIOD FLOW
    MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q    MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                                 SUM  14.86  11.46   3.39  264813.
                                                                     ( 377.)( 291.)(  86.)( 7498.67)


          *********        *********        *********        *********        *********

                                    HYDROGRAPH ROUTING

                   52 QUASCO LAKE INFLOWS - MODIFIED PULS METHOD

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            17       1       0       0       0       0       1       0       0
                                           ROUTING DATA
                   QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                     0.0   0.000    0.00       1       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0       0       0   0.000   0.000   0.000  92000.       0

STORAGE    66000.00   73200.00   79900.00   86500.00   93200.00   99000.00  106500.00  113200.00  119900.00  126500.00
          152900.00  205700.00

OUTFLOW      600.00     600.00     600.00    1100.00    1700.00    2300.00    2860.00    3400.00    3400.00    3400.00
           24000.00   69100.00


          *********        *********        *********        *********        *********

                                    HYDROGRAPH ROUTING

                   53 ROUTE QUASCO LAKE OUTLET FLOWS

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            18       1       0       0       0       0       1       0       0
                                           ROUTING DATA
                   QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                     0.0   0.000    0.00       0       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0       7       3   0.000   0.000   0.000      0.       0


          *********        *********        *********        *********        *********
```

COMBINE HYDROGRAPHS

54 COMBINE FLOWS WITH FLOWS AT NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

55 READ LOCAL FLOW C-6

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	19.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 90.00 QRCSN= 200.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 25018.
(377.)(281.)(96.)(710.41)

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

56 COMBINE LOCAL FLOW C-6 WITH FLOW AT NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

57 ROUTE FLOW AT 10 TO NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

```
                         NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                             0      7      3  0.000  0.000  0.000     0.       0


          *********         *********         *********         *********         *********

                                        SUB-AREA RUNOFF COMPUTATION

                 58 LOCAL INFLOW E-7

                         ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                            19      0      0      0      0      0      1      0      0

                                             HYDROGRAPH DATA
                 IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
                     1     -1  90.00   0.00 5100.00  0.00  0.000      0      1      0

                                               PRECIP DATA
                       SPFE    PMS     R6    R12    R24    R48    R72    R96
                       0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                LOSS DATA
               LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
                   0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                                              RECESSION DATA
                               STRTQ=  120.00    QRCSN=  400.00    RTIOR= 1.60

           0                                  END-OF-PERIOD FLOW
           MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS   COMP Q     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS   COMP Q


                                                                              SUM  14.06 [illegible]  3.70  122486.
                                                                                 ( 377.)( 201.)(  96.)( 3468.42)


          *********         *********         *********         *********         *********

                                           HYDROGRAPH ROUTING

                 59 ROUTE LOCAL FLOW TO NODE 21

                         ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                            21      1      0      0      0      0      1      0      0
                                             ROUTING DATA
                  QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                    0.0  0.000   0.00      0      1      0      0             0

                         NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                             0      6      2  0.000  0.000  0.000     0.       0


          *********         *********         *********         *********         *********

                                          COMBINE HYDROGRAPHS

                 60 COMBINE ROUTED FLOW WITH FLOW AT 21

                         ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                            21      2      0      0      0      0      1      0      0
```

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          **********          **********          **********          **********          **********

                                       SUB-AREA RUNOFF COMPUTATION

                   61 SKANEATELES LAKE INFLOWS

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 20       0       0       0       0       0       1       0       0

                                           HYDROGRAPH DATA
                    IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                        1      -1   74.00    0.00 5100.00    0.00   0.000       0       1       0

                                             PRECIP DATA
                        SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                              LOSS DATA
               LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                   0    0.00    0.00    1.00    0.00    0.00    1.00     .75     .05    0.00    0.00

                                            RECESSION DATA
                              STRTQ=  250.00    QRCSN=  500.00    RTIOR= 1.60

       0                                  END-OF-PERIOD FLOW
      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                             SUM  14.86  11.46   3.39  100?49.
                                                                               ( 377.)( 291.)(  86.)( 2847.23)


          **********          **********          **********          **********          **********

                                          HYDROGRAPH ROUTING

                   62 SKANEATELES LAKE OUTFLOWS

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 20       1       0       0       0       0       1       0       0
                                             ROUTING DATA
                      QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                        0.0   0.000    0.00       1       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  0       0       0   0.000   0.000   0.000      0.       0

STORAGE        0.00    17323.00    34756.00    52104.00   104360.00   208736.00   243492.00

OUTFLOW        0.00      353.00      747.00     1500.00     6403.00    13313.00    17359.00


          **********          **********          **********          **********          **********

                                          HYDROGRAPH ROUTING

                   63 ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 21       1       0       0       0       0       1       0       0
                                             ROUTING DATA
                      QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
```

```
                    0.0  0.000   0.00      0      1      0      0      0

                  NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                      0      6      2  0.000  0.000  0.000     0.       0


       *********       *********       *********       *********       *********

                                  COMBINE HYDROGRAPHS

              64 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE Z1

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     Z1       2       0       0       0       0       1       0       0


       *********       *********       *********       *********       *********

                                SUB-AREA RUNOFF COMPUTATION

              65 LOCAL FLOW C-7

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     Z1       0       0       0       0       0       1       0       0

                                      HYDROGRAPH DATA
            IHYDG   IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                1     -1   27.00    0.00 5100.00    0.00   0.000       0       1       0

                                        PRECIP DATA
                       SPFE     PMS      R6     R12     R24     R48     R72     R96
                       0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                         LOSS DATA
           LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
               0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                                       RECESSION DATA
                           STRTQ=   90.00   QRCSN=  200.00   RTIOR= 1.60

     0                                 END-OF-PERIOD FLOW
 MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                       SUM  14.06  11.00   3.70    35566.
                                                                          ( 377.)( 281.)(  96.)( 1007.12)


       *********       *********       *********       *********       *********

                                  COMBINE HYDROGRAPHS

              66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE Z1

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     Z1       2       0       0       0       0       1       0       0


       *********       *********       *********       *********       *********

                                    HYDROGRAPH ROUTING
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67 ROUTING TO NODE 22

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	4	1	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

68 LOCAL FLOW E-8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	90.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 120.00 QRCSN= 400.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 122095.
(377.)(281.)(96.)(3457.35)

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COMBINE HYDROGRAPHS

69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

70 BALDWINSVILLE POOL - MODIFIED PULS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

```
                                  22      1      0      0      0      0      1      0      0
                                                   ROUTING DATA
                     QLOSS   CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                       0.0   0.000   0.00      1      1      0      0             0

                             NSTPS   NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                                 0       0      0  0.000  0.000  0.000  3250.      0

STORAGE    3250.00    5000.00    8400.00   10000.00   11700.00   14000.00   17000.00   20000.00   24000.00   30000.00

OUTFLOW    3000.00    4000.00    6000.00    8000.00   10000.00   12000.00   14000.00   15300.00   16600.00   17000.00


           **********        **********        **********        **********        **********

                                          HYDROGRAPH ROUTING

                 71 ROUTE FLOW TO NODE 26

                             ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME ISTAGE  IAUTO
                                26       1       0       0      0      0       1      0      0
                                                   ROUTING DATA
                     QLOSS   CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                       0.0   0.000   0.00      0      1      0      0             0

                             NSTPS   NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                                 0       4      1  0.000  0.000  0.000     0.      0


           **********        **********        **********        **********        **********

                                       SUB-AREA RUNOFF COMPUTATION

                 72 INFLOW TO OTISCO LAKE C-3

                             ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME ISTAGE  IAUTO
                                23       0       0       0      0      0       1      0      0

                                                 HYDROGRAPH DATA
                IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                    1      -1   42.70    0.00 5100.00    0.00   0.000       0       1       0

                                                   PRECIP DATA
                         SPFE     PMS      R6     R12     R24     R48     R72     R96
                         0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                    LOSS DATA
              LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                  0    0.00    0.00    1.00    0.00    0.00    1.00     .75     .05    0.00    0.00

                                                RECESSION DATA
                              STRTQ=   90.00   QRCSN=  300.00   RTIOR= 1.60

         0                                  END-OF-PERIOD FLOW
     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                            SUM  14.86  11.46   3.39    57020.
                                                                               ( 377.)( 291.)(  86.)( 1637.51)


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                                        HYDROGRAPH ROUTING

                     73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD

                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                23       1       0       0       0       0       1       0       0
                                                   ROUTING DATA
                     QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                       0.0   0.000    0.00       1       1       0       0               0

                             NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                 0       0       0   0.000   0.000   0.000  29300.       0

STORAGE   19600.00   21000.00   23900.00   26100.00   28300.00   30500.00   32600.00   34800.00   37000.00   39200.00
          45700.00   52300.00   58800.00   65300.00

OUTFLOW     200.00     200.00     200.00     200.00     200.00     400.00     900.00    1600.00    2800.00    2800.00
           7060.00   10100.00   33700.00   53200.00


          **********        **********        **********        **********        **********

                                        HYDROGRAPH ROUTING

                     74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25

                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                25       1       0       0       0       0       1       0       0
                                                   ROUTING DATA
                     QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                       0.0   0.000    0.00       0       1       0       0               0

                             NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                 0      10       4   0.000   0.000   0.000      0.       0


          **********        **********        **********        **********        **********

                                      SUB-AREA RUNOFF COMPUTATION

                     75 INFLOW INTO ONONDAGA RESERVOIR   C-4

                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                24       0       0       0       0       0       1       0       0

                                                 HYDROGRAPH DATA
                  IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                      1      -1   60.00    0.00 5100.00    0.00   0.000       0       1       0

                                                   PRECIP DATA
                          SPFE     PMS      R6     R12     R24     R48     R72     R96
                          0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                    LOSS DATA
                 LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                     0    0.00    0.00    1.00    0.00    0.00    1.00    1.50     .06    0.00    0.00

                                                  RECESSION DATA
                                   STRTQ=  250.00   QRCSN=  300.00   RTIOR= 1.60

        0                                       END-OF-PERIOD FLOW
    MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
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                                                           SUM  14.06  10.60   4.26    83772.
                                                              ( 377.)( 269.)( 108.)( 2372.16)


              **********       **********       **********       **********       **********

                                          HYDROGRAPH ROUTING

                       76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 24       1       0       0       0       0       1       0       0
                                                     ROUTING DATA
                       QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                         0.0   0.000    0.00       1       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  0       0       0   0.000   0.000   0.000      0.       0

 STORAGE        0.00      100.00      700.00     1900.00     3500.00     7940.00    18200.00    22200.00    27000.00    32500.00
            43400.00    52300.00    62200.00    72100.00

 OUTFLOW       80.00      430.00      660.00      800.00     1070.00     1420.00     1770.00     1840.00     2000.00     2000.00
             6200.00    15400.00    28400.00    44700.00


              **********       **********       **********       **********       **********

                                          HYDROGRAPH ROUTING

                       77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 25       1       0       0       0       0       1       0       0
                                                     ROUTING DATA
                       QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                         0.0   0.000    0.00       0       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  0       0       3   0.000   0.000   0.000      0.       0


              **********       **********       **********       **********       **********

                                          COMBINE HYDROGRAPHS

                       78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 25       2       0       0       0       0       1       0       0


              **********       **********       **********       **********       **********

                                        SUB-AREA RUNOFF COMPUTATION

                       79 LOCAL INFLOW C-5

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 25       0       0       0       0       0       1       0       0
```

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	102.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 500.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 10.77 4.08 126945.
(377.)(274.)(104.)(3594.68)

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

00 COMBINE ROUTED FLOWS, LOCAL INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

01 LOCAL FLOW C-0

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	72.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.06	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 300.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

```
                                                    SUM 14.86 10.94 3.92 91383.
                                                      ( 377.)( 276.)( 100.)( 2587.60)


         **********          **********          **********          **********          **********

                                          COMBINE HYDROGRAPHS

                  82 COMBINE LOCAL FLOW AT NODE 25

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               25       2       0       0       0       0       1       0       0


         **********          **********          **********          **********          **********

                                          HYDROGRAPH ROUTING

                  83 ROUTE FLOWS TO NODE 26

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               26       1       0       0       0       0       1       0       0
                                                   ROUTING DATA
                  QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                    0.0    0.000    0.00       0       1       0       0               0

                            NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                0       0       3   0.000   0.000   0.000      0.       0


         **********          **********          **********          **********          **********

                                          COMBINE HYDROGRAPHS

                  84 COMBINE ROUTED FLOW AND FLOW AT NODE 26

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               26       2       0       0       0       0       1       0       0


         **********          **********          **********          **********          **********

                                          HYDROGRAPH ROUTING

                  85 ROUTE FLOWS TO NODE 28 (THREE RIVERS)

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               28       1       0       0       0       0       1       0       0
                                                   ROUTING DATA
                  QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                    0.0    0.000    0.00       0       1       0       0               0

                            NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                0       6       2   0.000   0.000   0.000      0.       0


         **********          **********          **********          **********          **********

                                        SUB-AREA RUNOFF COMPUTATION

                  86 LOCAL FLOW  (E-9)  AT NODE 27
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```
              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 27      0      0      0      0      0      1      0      0

                              HYDROGRAPH DATA
        IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
            1     -1  37.00   0.00 5100.00  0.00  0.000      0      1      0

                                PRECIP DATA
                SPFE    PMS     R6    R12    R24    R48    R72    R96
                0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                 LOSS DATA
   LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
       0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                               RECESSION DATA
                 STRTQ=  100.00   QRCSN=  150.00   RTIOR= 1.60

   0                          END-OF-PERIOD FLOW
MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q     MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                       SUM 14.86  11.08  3.78  46874.
                                                         ( 377.)( 281.)( 96.)( 1327.32)


       *********      *********      *********      *********      *********

                              HYDROGRAPH ROUTING

       07 ROUTE LOCAL FLOW E-9 TO NODE 28

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 28      1      0      0      0      1      0      0      0
                               ROUTING DATA
        QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
          0.0  0.000   0.00      0      1      0      0             0

              NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                  0      3      1  0.000  0.000  0.000     0.      0

                     STATION     28, PLAN 1, RTIO 1

                                   OUTFLOW
      19.      19.      18.      17.      17.      37.      168.     235.     280.     528.
    1549.    2110.    1984.     996.     473.     259.     173.      74.      37.      28.
      27.      26.      25.      24.      22.      21.      20.      20.      19.      18.
      17.      16.      15.      15.      14.      13.      13.      12.      12.      11.

                      PEAK  6-HOUR  24-HOUR  72-HOUR  TOTAL VOLUME
             CFS     2110.   2040.    1602.     734.         9360.
             CMS       60.     58.      45.      21.          265.
          INCHES               .51     1.61     2.22          2.36
              MM             13.00    40.91    56.20         59.82
           AC-FT              1015.    3177.    4370.         4645.
       THOUS CU M             1253.    3919.    5390.         5730.


                     STATION     28, PLAN 1, RTIO 2

                                   OUTFLOW
      38.      38.      36.      35.      33.      75.      337.     470.     559.    1056.
```

[illegible]	4221.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	57.
54.	52.	49.	47.	45.	43.	41.	39.	37.	36.
34.	32.	31.	29.	28.	27.	26.	24.	23.	23.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4221.	4096.	3203.	1469.	10736.
CMS	120.	116.	91.	42.	531.
INCHES		1.03	3.22	4.43	4.71
MM		26.16	81.83	112.55	119.65
AC-FT		2031.	6354.	8740.	9291.
THOUS CU M		2505.	7837.	10780.	11460.

STATION 20, PLAN 1, RTIO 3

OUTFLOW

48.	47.	46.	43.	41.	93.	421.	560.	699.	1320.
3072.	5276.	4964.	2491.	1102.	647.	432.	185.	92.	71.
68.	65.	62.	59.	56.	54.	51.	49.	47.	44.
42.	40.	39.	37.	35.	33.	32.	30.	29.	28.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5276.	5120.	4004.	1836.	23420.
CMS	149.	145.	113.	52.	663.
INCHES		1.29	4.03	5.54	5.89
MM		32.69	102.28	140.69	149.56
AC-FT		2539.	7942.	10925.	11613.
THOUS CU M		3131.	9797.	13475.	14325.

STATION 20, PLAN 1, RTIO 4

OUTFLOW

57.	56.	55.	52.	50.	112.	505.	705.	839.	1584.
4646.	6331.	5957.	2989.	1419.	777.	519.	222.	111.	85.
81.	78.	74.	71.	67.	64.	61.	59.	56.	53.
51.	48.	46.	44.	42.	40.	38.	37.	35.	34.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6331.	6144.	4805.	2203.	28105.
CMS	179.	174.	136.	62.	796.
INCHES		1.54	4.83	6.65	7.07
MM		39.23	122.74	168.83	179.47
AC-FT		3046.	9531.	13109.	13936.
THOUS CU M		3758.	11756.	16170.	17190.

STATION 20, PLAN 1, RTIO 5

OUTFLOW

76.	75.	73.	70.	66.	149.	674.	900.	1118.	2112.
6195.	8441.	7942.	3986.	1891.	1036.	692.	296.	148.	114.
108.	103.	99.	94.	90.	86.	82.	78.	74.	71.
68.	65.	62.	59.	56.	54.	51.	49.	47.	45.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8441.	8192.	6407.	2937.	37473.
CMS	239.	232.	181.	83.	1061.
INCHES		2.06	6.44	8.86	9.42
MM		52.31	163.65	225.10	239.30
AC-FT		4062.	12708.	17479.	18582.
THOUS CU M		5010.	15675.	21560.	22920.

STATION 28, PLAN 1, RTIO 6

OUTFLOW

95.	94.	91.	87.	83.	107.	842.	1175.	1398.	2640.
7744.	10551.	9920.	4902.	2364.	1295.	864.	370.	184.	142.
136.	129.	123.	118.	112.	107.	102.	98.	93.	89.
85.	81.	77.	74.	70.	67.	64.	61.	58.	56.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10551.	10240.	8009.	3672.	46041.
CMS	299.	290.	227.	104.	1326.
INCHES		2.57	8.05	11.08	11.78
MM		65.39	204.57	281.38	299.12
AC-FT		5077.	15885.	21849.	23227.
THOUS CU M		6263.	19594.	26950.	28650.

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

88 COMBINE HYDROGRAPHS AT 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

89 INFLOWS TO BARGE CANAL FROM EASTERN END OF BASIN (C-2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
29	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	100.00	0.00	3100.00	0.00	0.000	0	1	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

90 ROUTE FLOW AT NODE 29 TO NODE 30

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

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                              SUB-AREA RUNOFF COMPUTATION

               91 LOCAL INFLOW D-4

                          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             30       0       0       0       0       0       1       0       0

                                       HYDROGRAPH DATA
               IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                   1      -1  529.00    0.00 5100.00    0.00   0.000       0       1       0

                                         PRECIP DATA
                      SPFE     PMS      R6     R12     R24     R48     R72     R96
                      0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                          LOSS DATA
            LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                0    0.00    0.00    1.00    0.00    0.00    1.00     .25     .06    0.00    0.00

                                        RECESSION DATA
                            STRTQ=  800.00    QRCSN= 3960.00    RTIOR= 1.60

        0                              END-OF-PERIOD FLOW
    MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                               SUM  14.06  11.00   3.78  681577.
                                                                                  ( 377.)( 281.)(  96.)(19300.11)


          **********          **********          **********          **********          **********

                                   COMBINE HYDROGRAPHS

               92 COMBINE LOCAL FLOW WITH ROUTED FLOW

                          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             30       2       0       0       0       0       1       0       0


          **********          **********          **********          **********          **********

                                    HYDROGRAPH ROUTING

               93 ROUTE FLOWS TO NODE 31

                          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             31       1       0       0       0       0       1       0       0
                                         ROUTING DATA
                   QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                     0.0   0.000    0.00       0       1       0       0               0

                           NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                               0       1       0   0.000   0.000   0.000      0.       0


          **********          **********          **********          **********          **********

                               SUB-AREA RUNOFF COMPUTATION

               94 LOCAL FLOW D-3
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                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       31       0       0       0       0       0       1       0       0

                                       HYDROGRAPH DATA
            IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                1      -1  144.00    0.00 5100.00    0.00   0.000       0       1       0

                                         PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                          LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00     .25     .06    0.00    0.00

                                       RECESSION DATA
                      STRTQ=  320.00     QRCSN= 1000.00     RTIOR= 2.00

       0                                END-OF-PERIOD FLOW
     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                        SUM  14.06  11.00   3.70  176726.
                                                                           ( 377.)( 281.)(  96.)( 5004.32)



            **********          **********          **********          **********          **********

                                     COMBINE HYDROGRAPHS

                 95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       31       2       0       0       0       0       1       0       0



            **********          **********          **********          **********          **********

                                   SUB-AREA RUNOFF COMPUTATION

                 96 LOCAL FLOW D-2

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       31       0       0       0       0       0       1       0       0

                                       HYDROGRAPH DATA
            IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                1      -1  105.00    0.00 5100.00    0.00   0.000       0       1       0

                                         PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                          LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00     .25     .06    0.00    0.00

                                       RECESSION DATA
                      STRTQ=  240.00     QRCSN=  800.00     RTIOR= 1.60

       0                                END-OF-PERIOD FLOW
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    MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q      MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                                   SUM  14.86  11.08   3.78  136512.
                                                                      ( 377.)( 281.)(  96.)( 3865.59)


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                                      COMBINE HYDROGRAPHS

                    97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 31       2       0       0       0       0       1       0       0


             *********       *********       *********       *********       *********

                                    SUB-AREA RUNOFF COMPUTATION

                    98 LOCAL FLOW D-1

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 31       0       0       0       0       0       1       0       0

                                          HYDROGRAPH DATA
                       IHYDG   IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                           1     -1  200.00    0.00 3100.00    0.00   0.000       0       1       0

                                            PRECIP DATA
                              SPFE     PMS      R6     R12     R24     R48     R72     R96
                              0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                             LOSS DATA
                  LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                      0    0.00    0.00    1.00    0.00    0.00    1.00     .25     .04    0.00    0.00

                                           RECESSION DATA
                                 STRTQ=   600.00   QRCSN=  2160.00   RTIOR= 1.60

       0                                 END-OF-PERIOD FLOW
    MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q      MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                                   SUM  14.86  11.08   3.78  361708.
                                                                      ( 377.)( 281.)(  96.)(10244.70)


             *********       *********       *********       *********       *********

                                      COMBINE HYDROGRAPHS

                    99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 31       2       0       0       0       0       1       0       0


             *********       *********       *********       *********       *********

                                    SUB-AREA RUNOFF COMPUTATION
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                              SUB-AREA RUNOFF COMPUTATION

           100 LOCAL FLOW D-5

                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        31       0       0       0       0       0       1       0       0

                                         HYDROGRAPH DATA
                IHYDG   IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                    1     -1  269.00    0.00 5100.00    0.00   0.000       0       1       0

                                           PRECIP DATA
                        SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                            LOSS DATA
               LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                   0    0.00    0.00    1.00    0.00    0.00    1.00     .25     .05    0.00    0.00

                                          RECESSION DATA
                        STRTQ=  540.00     QRCSN=  2000.00     RTIOR=  1.60

       0                                 END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                        SUM   14.86   11.56    3.30   363523.
                                                                            ( 377.)( 294.)(  84.)(10293.83)


        **********       **********       **********       **********       **********

                                       COMBINE HYDROGRAPHS

           101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31

                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        31       2       0       0       0       0       1       0       0


        **********       **********       **********       **********       **********

                                       HYDROGRAPH ROUTING

           102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD

                     ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        31       1       0       0       0       0       1       0       0
                                         ROUTING DATA
                 QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                   0.0   0.000    0.00       1       1       0       0               0

                        NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                            0       0       0   0.000   0.000   0.000 670000.       0

STORAGE   442000.00   635000.00   640000.00   650000.00   680000.00   735000.00   806000.00   845000.00       0.00       0.00
          990000.00  1150000.00  1304000.00

OUTFLOW     1000.00     1000.00     2000.00     4000.00     6000.00     8000.00    10000.00    11000.00       0.00       0.00
           27900.00    64700.00   116600.00


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              **********        **********        **********        **********        **********

                                          HYDROGRAPH ROUTING

                  103 ROUTE FLOWS TO NODE 32

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 32       1       0       0       0       0       1       0       0
                                                   ROUTING DATA
                  QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                    0.0   0.000    0.00       0       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  0       1       0   0.000   0.000   0.000      0.       0


              **********        **********        **********        **********        **********

                                       SUB-AREA RUNOFF COMPUTATION

                  104 LOCAL FLOW D-6

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 32       0       0       0       0       0       1       0       0

                                                  HYDROGRAPH DATA
                  IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                      1      -1   20.00    0.00 5100.00    0.00   0.000       0       1       0

                                                    PRECIP DATA
                          SPFE     PMS      R6     R12     R24     R48     R72     R96
                          0.00   21.50   33.00   47.00   55.00   65.06   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                     LOSS DATA
            LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .04    0.00    0.00

                                                   RECESSION DATA
                              STRTQ=   70.00   QRCSN=  210.00   RTIOR= 1.60

           0                                     END-OF-PERIOD FLOW
      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                             SUM  14.06  11.00   3.78   36804.
                                                                                ( 377.)( 281.)(  96.)( 1044.44)



              **********        **********        **********        **********        **********

                                           COMBINE HYDROGRAPHS

                  105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 32       2       0       0       0       0       1       0       0


              **********        **********        **********        **********        **********

                                          HYDROGRAPH ROUTING

                  106 ROUTE FLOW AT 32 TO NODE 30
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         106 ROUTE FLOW AT 32 TO NODE 20

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                    20      1      0      0      0      0      1      0      0
                                      ROUTING DATA
           QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
             0.0  0.000   0.00      0      1      0      0             0

                 NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                     0      6      2  0.000  0.000  0.000     0.        0


     **********     **********     **********     **********     **********

                                   COMBINE HYDROGRAPHS

         107 COMBINE ROUTED FLOW WITH FLOW AT NODE 20

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                    20      2      0      0      0      0      1      0      0


     **********     **********     **********     **********     **********

                                 SUB-AREA RUNOFF COMPUTATION

         108 LOCAL FLOW 8-7

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                    20      0      0      0      0      0      1      0      0

                                     HYDROGRAPH DATA
       IHYDG    IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
           1      -1 110.00   0.00 5100.00  0.00  0.000      0      1      0

                                       PRECIP DATA
               SPFE    PMS     R6    R12    R24    R48    R72    R96
               0.00  21.50  33.00  47.00  55.00  65.00  72.00  77.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                        LOSS DATA
      LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
          0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                                      RECESSION DATA
                     STRTQ=  250.00   QRCSN=  800.00   RTIOR= 2.00

           0                          END-OF-PERIOD FLOW
   MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  15.46  11.25   4.21  130503.
                                                                             ( 393.)( 286.)( 107.)( 3924.23)


     **********     **********     **********     **********     **********

                                   COMBINE HYDROGRAPHS

         109 COMBINE WITH FLOW AT NODE 20

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                    20      2      0      0      0      1      1      0      0
```

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 1

8875.	8852.	8835.	8814.	8772.	8751.	8953.	9171.	9387.	10184.
12925.	15932.	18110.	19116.	20399.	22072.	23690.	24853.	25760.	26136.
26110.	25817.	25341.	24713.	24079.	23540.	23137.	22847.	22676.	22610.
22649.	22741.	22856.	22946.	23041.	23064.	23024.	22909.	22782.	22636.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26136.	26123.	25903.	24637.	753394.
CMS	740.	740.	734.	698.	21334.
INCHES		.05	.19	.54	1.37
MM		1.20	4.77	13.61	34.78
AC-FT		12954.	51379.	146600.	373504.
THOUS CU M		15978.	63375.	180828.	460709.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 2

9194.	9172.	9183.	9204.	9280.	9256.	9778.	10326.	10873.	12582.
18236.	24255.	28504.	30267.	32346.	35068.	37554.	39109.	40302.	40630.
40357.	39735.	38900.	37933.	37060.	36447.	36090.	35900.	35864.	35971.
36207.	36550.	36973.	37440.	37939.	38410.	38828.	39161.	39402.	39559.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40630.	40510.	40210.	38315.	1155580.
CMS	1151.	1147.	1139.	1085.	32722.
INCHES		.07	.29	.83	2.10
MM		1.87	7.41	21.17	53.22
AC-FT		20080.	79755.	227993.	573015.
THOUS CU M		24770.	98376.	281225.	706803.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 3

9353.	9332.	9357.	9399.	9414.	9580.	10191.	10904.	11615.	13797.
20060.	28325.	33482.	35435.	37701.	40731.	43514.	45298.	46650.	46955.
46699.	46065.	45287.	44180.	43287.	42689.	42403.	42299.	42352.	42545.
42850.	43269.	43752.	44276.	44810.	45319.	45766.	46123.	46381.	46549.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46955.	46827.	46496.	44555.	1340699.
CMS	1330.	1326.	1317.	1262.	37964.
INCHES		.08	.34	.97	2.43
MM		2.16	8.57	24.62	61.74
AC-FT		23220.	92224.	265123.	664810.
THOUS CU M		28641.	113757.	327024.	820031.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 4

9513.	9492.	9531.	9595.	9628.	9761.	10604.	11483.	12358.	15818.
23482.	32353.	38377.	40457.	42871.	46182.	49260.	51253.	52815.	53242.
53063.	52458.	51593.	50531.	49638.	49076.	48880.	48877.	49031.	49317.
49711.	50109.	50725.	51293.	51859.	52391.	52852.	53211.	53466.	53627.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53627.	53547.	53135.	51275.	1527493.
CMS	1519.	1516.	1505.	1452.	43254.
INCHES		.10	.39	1.12	2.77
MM		2.47	9.79	28.34	70.34
AC-FT		26552.	105391.	305106.	757435.
THOUS CU M		32751.	129998.	376342.	934282.

```
                    SUM OF 2 HYDROGRAPHS AT      28  PLAN 1  RTIO 5
  9831.     9813.     9879.     9985.    10050.    10267.    11430.    12640.    13863.    17443.
 28680.    40290.    47974.    50270.    52909.    56964.    60770.    63310.    65400.    66295.
 66360.    65840.    64971.    63800.    62825.    62263.    62134.    62211.    62450.    62820.
 63301.    63860.    64490.    65164.    65834.    66460.    67021.    67451.    67750.    67951.

                     PEAK    6-HOUR   24-HOUR   72-HOUR  TOTAL VOLUME
             CFS    67951.    67854.    67360.    65143.     1904350.
             CMS     1924.     1921.     1907.     1845.       53925.
          INCHES                .12       .49      1.42         3.45
              MM               3.12     12.41     36.08        87.70
           AC-FT              33647.   133606.   387626.      944310.
       THOUS CU M             41503.   164801.   478129.     1164789.


                    SUM OF 2 HYDROGRAPHS AT      28  PLAN 1  RTIO 6
 10150.    10133.    10228.    10376.    10487.    10774.    12257.    13819.    15410.    19894.
 33060.    48171.    57454.    59943.    62941.    67609.    72185.    75346.    78178.    79485.
 79789.    79278.    78374.    77086.    75992.    75392.    75293.    75428.    75715.    76152.
 76718.    77360.    78102.    78885.    79683.    80444.    81114.    81640.    82016.    82255.

                     PEAK    6-HOUR   24-HOUR   72-HOUR  TOTAL VOLUME
             CFS    82255.    82136.    81530.    78889.     2279843.
             CMS     2329.     2326.     2309.     2234.       64535.
          INCHES                .15       .59      1.72         4.13
              MM               3.78     15.02     43.60       104.95
           AC-FT              40728.   161712.   469421.     1130104.
       THOUS CU M             50238.   199469.   579023.     1393963.


 **********          **********          **********          **********          **********

                                   HYDROGRAPH ROUTING

          110 ROUTE FLOW AT 28 TO NODE 33

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     33       1       0       0       0       1       1       0       0
                                      ROUTING DATA
          QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
            0.0   0.000    0.00       0       1       0       0               0

                  NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                      0       3       1   0.000   0.000   0.000      0.       0

                          STATION     33, PLAN 1, RTIO 1

                                        OUTFLOW
  8875.     8860.     8854.     8834.     8807.     8779.     8825.     8950.     9171.     9501.
 10832.    13014.    15654.    17719.    19280.    20529.    22056.    23341.    24770.    25503.
 26082.    26021.    25756.    25291.    24711.    24111.    23585.    23175.    22887.    22713.
 22640.    22669.    22749.    22854.    22954.    23024.    23043.    22999.    22905.    22824.

                     PEAK    6-HOUR   24-HOUR   72-HOUR  TOTAL VOLUME
             CFS    26021.    26012.    25884.    24585.      739529.
             CMS      737.      737.      731.      696.       20941.
          INCHES                .05       .19       .53         1.34
```

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
MM		1.20	4.75	13.39	34.00
AC-FT		12090.	51181.	146290.	366709.
THOUS CU M		15910.	63131.	180446.	452320.

STATION 33, PLAN 1, RTIO 2

OUTFLOW

9194.	9187.	9183.	9186.	9196.	9220.	9411.	9707.	10326.	11260.
13097.	18350.	23665.	27675.	30372.	32560.	34909.	37270.	39042.	40070.
40459.	40244.	39667.	38859.	37970.	37149.	36535.	36146.	35952.	35912.
36014.	36242.	36574.	36990.	37453.	37932.	38392.	38799.	39130.	39322.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40459.	40351.	40032.	38240.	1125333.
CMS	1146.	1143.	1134.	1083.	31866.
INCHES		.07	.29	.83	2.04
MM		1.86	7.37	21.13	51.82
AC-FT		20009.	79402.	227544.	558016.
THOUS CU M		24681.	97940.	280671.	688303.

STATION 33, PLAN 1, RTIO 3

OUTFLOW

9353.	9346.	9348.	9363.	9390.	9441.	9704.	10201.	10903.	12106.
15424.	20994.	27556.	32414.	35539.	37956.	40649.	43181.	45154.	46301.
46760.	46573.	45990.	45151.	44225.	43305.	42793.	42463.	42351.	42398.
42585.	42891.	43293.	43766.	44279.	44802.	45298.	45736.	46090.	46295.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46760.	46670.	46304.	44495.	1303631.
CMS	1324.	1322.	1311.	1260.	36915.
INCHES		.08	.34	.97	2.36
MM		2.15	8.53	24.59	60.03
AC-FT		23142.	91842.	264766.	646429.
THOUS CU M		28546.	113285.	326583.	797358.

STATION 33, PLAN 1, RTIO 4

OUTFLOW

9513.	9506.	9512.	9539.	9585.	9661.	9998.	10616.	11482.	12953.
16953.	23610.	31404.	37062.	40560.	43170.	46107.	48901.	51112.	52437.
53040.	52921.	52372.	51520.	50585.	49745.	49195.	48944.	48929.	49075.
49353.	49739.	50200.	50736.	51292.	51847.	52367.	52810.	53176.	53381.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53381.	53279.	52704.	50892.	1483502.
CMS	1512.	1509.	1494.	1441.	42008.
INCHES		.10	.38	1.11	2.69
MM		2.45	9.72	28.12	68.32
AC-FT		26419.	104616.	302829.	735621.
THOUS CU M		32588.	129042.	373533.	907375.

STATION 33, PLAN 1, RTIO 5

OUTFLOW

9031.	9025.	9041.	9092.	9974.	10183.	10585.	11446.	12644.	14640.
19995.	28887.	38904.	46183.	50413.	53411.	56980.	60349.	63186.	65028.
66085.	66160.	65726.	64876.	63868.	62965.	62407.	62203.	62265.	62494.

[illegible]

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67656.	67533.	66892.	64674.	1046386.
CMS	1916.	1912.	1894.	1831.	52284.
INCHES		.12	.49	1.41	3.35
MM		3.11	12.32	35.74	85.03
AC-FT		33487.	132679.	384838.	915563.
THOUS CU M		41306.	163657.	474691.	1129331.

STATION 33, PLAN 1, RTIO 6

OUTFLOW

10150.	10144.	10170.	10246.	10364.	10546.	11173.	12283.	13829.	16374.
23055.	33975.	46495.	55109.	60113.	63498.	67570.	71713.	75236.	77643.
79097.	79464.	79120.	78246.	77151.	76156.	75559.	75368.	75476.	75762.
76192.	76743.	77393.	78118.	78890.	79671.	80414.	81066.	81590.	81891.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	81891.	81740.	80963.	78329.	2207121.
CMS	2319.	2315.	2293.	2218.	62499.
INCHES		.15	.59	1.70	4.00
MM		3.76	14.91	43.29	101.64
AC-FT		40532.	160507.	466080.	1094440.
THOUS CU M		49996.	198001.	574912.	1349972.

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1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

				RATIOS APPLIED TO FLOWS					
OPERATION	STATION	AREA	PLAN	RATIO 1 .20	RATIO 2 .40	RATIO 3 .50	RATIO 4 .60	RATIO 5 .80	RATIO 6 1.00
HYDROGRAPH AT	1	100.00	1	78.	157.	196.	235.	314.	392.
		(259.00)	(	2.22)(	4.44)(	5.55)(	6.66)(	8.88)(	11.10)(
ROUTED TO	2	100.00	1	78.	156.	195.	234.	311.	389.
		(259.00)	(	2.20)(	4.41)(	5.51)(	6.61)(	8.82)(	11.02)(
HYDROGRAPH AT	2	147.00	1	5716.	11432.	1[illegible]1.	17149.	22865.	28581.
		(380.73)	(	161.86)(	323.73)(	404.66)(	485.59)(	647.46)(	809.32)(
2 COMBINED	2	247.00	1	5793.	11585.	14481.	17378.	23170.	28963.
		(639.73)	(	164.03)(	328.05)(	410.07)(	492.08)(	656.11)(	820.13)(
ROUTED TO	6	247.00	1	3651.	7301.	9127.	10952.	14602.	18253.
		(639.73)	(	103.37)(	206.75)(	258.43)(	310.12)(	413.50)(	516.87)(
HYDROGRAPH AT	6	118.00	1	2735.	5469.	6837.	8204.	10939.	13674.
		(305.62)	(	77.44)(	154.88)(	193.60)(	232.32)(	309.75)(	387.19)(
2 COMBINED	6	365.00	1	6222.	12444.	15555.	18666.	24888.	31110.
		(945.35)	(	176.19)(	352.38)(	440.47)(	528.57)(	704.75)(	880.94)(

HYDROGRAPH AT	3	51.00	1	3559.	7119.	8898.	10678.	14237.	17797.
		(132.09)	(	100.79)(	201.58)(	251.97)(	302.37)(	403.16)(	503.95)(
ROUTED TO	6	51.00	1	1974.	3948.	4934.	5921.	7895.	9869.
		(132.09)	(	55.89)(	111.78)(	139.73)(	167.67)(	223.56)(	279.46)(
2 COMBINED	6	416.00	1	6557.	13115.	16393.	19672.	26229.	32787.
		(1077.44)	(	185.68)(	371.36)(	464.21)(	557.05)(	742.73)(	928.41)(
HYDROGRAPH AT	4	184.00	1	14208.	28416.	35520.	42624.	56832.	71040.
		(476.56)	(	402.32)(	804.65)(	1005.81)(	1206.97)(	1609.30)(	2011.62)(
ROUTED TO	4	184.00	1	868.	1985.	2666.	5119.	11584.	18145.
		(476.56)	(	24.58)(	56.20)(	75.48)(	144.96)(	328.03)(	513.80)(
ROUTED TO	5	184.00	1	828.	1833.	2447.	3475.	6907.	10624.
		(476.56)	(	23.45)(	51.89)(	69.29)(	98.40)(	195.59)(	300.84)(
HYDROGRAPH AT	5	102.00	1	2638.	5276.	6595.	7914.	10552.	13190.
		(264.18)	(	74.70)(	149.40)(	186.75)(	224.11)(	298.81)(	373.51)(
2 COMBINED	5	286.00	1	3060.	6020.	7544.	9246.	13808.	18651.
		(740.74)	(	86.66)(	170.47)(	213.63)(	261.82)(	390.99)(	528.15)(
ROUTED TO	56	286.00	1	2577.	5093.	6405.	7999.	12497.	17263.
		(740.74)	(	72.97)(	144.22)(	181.38)(	226.50)(	353.88)(	488.83)(
HYDROGRAPH AT	56	155.00	1	4849.	9698.	12123.	14548.	19397.	24246.
		(401.45)	(	137.32)(	274.63)(	343.29)(	411.95)(	549.26)(	686.58)(
2 COMBINED	56	441.00	1	7157.	14184.	17730.	21420.	29528.	37918.
		(1142.19)	(	202.66)(	401.65)(	502.07)(	606.56)(	836.13)(	1073.71)(
ROUTED TO	6	441.00	1	7157.	14184.	17730.	21420.	29528.	37918.
		(1142.19)	(	202.66)(	401.65)(	502.07)(	606.56)(	836.13)(	1073.71)(
2 COMBINED	6	857.00	1	13498.	26867.	33585.	40445.	54894.	69626.
		(2219.62)	(	382.23)(	760.80)(	951.01)(	1145.28)(	1554.43)(	1971.59)(
ROUTED TO	8	857.00	1	11700.	23294.	29131.	35158.	48028.	61131.
		(2219.62)	(	331.29)(	659.62)(	824.91)(	995.56)(	1360.00)(	1731.02)(
HYDROGRAPH AT	7	89.00	1	3132.	6264.	7830.	9396.	12528.	15660.
		(230.51)	(	88.69)(	177.38)(	221.72)(	266.07)(	354.76)(	443.44)(
ROUTED TO	8	89.00	1	2937.	5873.	7342.	8810.	11746.	14683.
		(230.51)	(	83.16)(	166.31)(	207.89)(	249.47)(	332.62)(	415.78)(
2 COMBINED	8	946.00	1	12296.	24459.	30571.	36838.	50268.	63931.
		(2450.13)	(	348.18)(	692.59)(	865.68)(	1043.14)(	1423.43)(	1810.31)(
ROUTED TO	10	946.00	1	11829.	23528.	29410.	35496.	48475.	61680.
		(2450.13)	(	334.95)(	666.25)(	832.79)(	1005.12)(	1372.67)(	1746.58)(
HYDROGRAPH AT	9	18.00	1	608.	1217.	1521.	1825.	2433.	3042.
		(46.62)	(	17.23)(	34.45)(	43.07)(	51.68)(	68.91)(	86.13)(
ROUTED TO	10	18.00	1	601.	1201.	1502.	1802.	2403.	3003.
		(46.62)	(	17.01)(	34.02)(	42.52)(	51.03)(	68.04)(	85.05)(
2 COMBINED	10	964.00	1	11922.	23714.	29642.	35718.	48772.	62051.
		(2496.75)	(	337.58)(	671.51)(	839.37)(	1011.43)(	1381.08)(	1757.09)(
ROUTED TO	15	964.00	1	11544.	22961.	28702.	34595.	47266.	60158.
		(2496.75)	(	326.88)(	650.18)(	812.76)(	979.61)(	1338.43)(	1703.49)(

HYDROGRAPH AT	11	183.00	1	20366.	40732.	50915.	61098.	81464.	101830.
		(473.97)		(576.70)	(1153.40)	(1441.75)	(1730.10)	(2306.80)	(2883.49)
ROUTED TO	11	183.00	1	560.	839.	1036.	1282.	1845.	2406.
		(473.97)		(15.85)	(23.74)	(29.34)	(36.30)	(52.23)	(68.14)
ROUTED TO	12	183.00	1	559.	831.	1026.	1263.	1817.	2371.
		(473.97)		(15.83)	(23.52)	(29.05)	(35.78)	(51.46)	(67.13)
HYDROGRAPH AT	12	524.00	1	41859.	83718.	104647.	125577.	167436.	209295.
		(1357.15)		(1185.31)	(2370.62)	(2963.28)	(3555.94)	(4741.25)	(5926.56)
2 COMBINED	12	707.00	1	42350.	84221.	105156.	126101.	167996.	209892.
		(1831.12)		(1199.22)	(2384.88)	(2977.69)	(3570.79)	(4757.11)	(5943.40)
ROUTED TO	12	707.00	1	700.	2514.	3000.	4713.	12318.	19824.
		(1831.12)		(19.82)	(71.20)	(84.95)	(133.47)	(348.82)	(561.34)
ROUTED TO	13	707.00	1	700.	2508.	3000.	4701.	12312.	19707.
		(1831.12)		(19.82)	(71.01)	(84.95)	(133.12)	(348.65)	(558.05)
HYDROGRAPH AT	13	39.00	1	1958.	3915.	4894.	5873.	7831.	9789.
		(101.01)		(55.44)	(110.87)	(138.59)	(166.31)	(221.75)	(277.18)
2 COMBINED	13	746.00	1	2658.	4615.	5657.	7109.	13847.	21998.
		(1932.13)		(75.26)	(130.69)	(160.19)	(201.31)	(392.09)	(622.90)
ROUTED TO	14	746.00	1	1917.	3419.	4912.	5982.	13164.	20914.
		(1932.13)		(54.28)	(96.83)	(139.09)	(169.39)	(372.76)	(592.22)
HYDROGRAPH AT	14	36.00	1	1927.	3854.	4817.	5780.	7707.	9634.
		(93.24)		(54.56)	(109.12)	(136.40)	(163.68)	(218.24)	(272.80)
2 COMBINED	14	782.00	1	3364.	6028.	7370.	8781.	13470.	21512.
		(2025.37)		(95.26)	(170.69)	(208.71)	(248.66)	(381.42)	(609.16)
HYDROGRAPH AT	14	782.00	1	43279.	86557.	108197.	129836.	173114.	216393.
		(2025.37)		(1225.51)	(2451.03)	(3063.78)	(3676.54)	(4902.05)	(6127.57)
2 COMBINED	14	1564.00	1	46193.	91686.	114432.	137179.	182681.	228285.
		(4050.74)		(1308.04)	(2596.25)	(3240.36)	(3884.47)	(5172.96)	(6464.31)
ROUTED TO	14	1564.00	1	3400.	8700.	8700.	8700.	8700.	8700.
		(4050.74)		(96.28)	(246.36)	(246.36)	(246.36)	(246.36)	(246.36)
ROUTED TO	15	1564.00	1	3400.	8700.	8700.	8700.	8700.	8700.
		(4050.74)		(96.28)	(246.36)	(246.36)	(246.36)	(246.36)	(246.36)
2 COMBINED	15	2528.00	1	14944.	31661.	37402.	43295.	55966.	68858.
		(6547.49)		(423.15)	(896.54)	(1059.12)	(1225.97)	(1584.78)	(1949.84)
ROUTED TO	18	2528.00	1	14139.	30071.	35426.	40960.	52754.	64739.
		(6547.49)		(400.37)	(851.52)	(1003.14)	(1159.86)	(1493.83)	(1833.21)
HYDROGRAPH AT	16	191.00	1	8770.	17539.	21924.	26309.	35079.	43849.
		(494.69)		(248.33)	(496.66)	(620.83)	(744.99)	(993.32)	(1241.65)
ROUTED TO	18	191.00	1	8307.	16613.	20766.	24920.	33226.	41533.
		(494.69)		(235.22)	(470.43)	(588.04)	(705.65)	(940.86)	(1176.08)
2 COMBINED	18	2719.00	1	14213.	30219.	35610.	41181.	53049.	65108.
		(7042.10)		(402.46)	(855.70)	(1008.36)	(1166.12)	(1502.18)	(1843.65)
HYDROGRAPH AT	17	201.00	1	11920.	23840.	29801.	35761.	47681.	59601.
		(520.59)		(337.54)	(675.09)	(843.86)	(1012.63)	(1350.17)	(1687.71)

ROUTED TO	17	201.00	1	2323.	3400.	6860.	10899.	19284.	27153.
		(520.59)	(	71.45)(	96.28)(	194.25)(	308.61)(	546.11)(	768.87)(
ROUTED TO	18	201.00	1	2440.	3400.	5197.	8317.	14130.	20256.
		(520.59)	(	69.09)(	96.28)(	147.16)(	235.52)(	400.12)(	573.58)(
2 COMBINED	18	2920.00	1	16048.	33461.	39010.	44581.	56449.	68523.
		(7562.77)	(	454.42)(	947.51)(	1104.64)(	1262.40)(	1598.46)(	1940.35)(
HYDROGRAPH AT	18	19.00	1	708.	1416.	1770.	2124.	2831.	3539.
		(49.21)	(	20.04)(	40.09)(	50.11)(	60.13)(	80.18)(	100.22)(
2 COMBINED	18	2939.00	1	16082.	33529.	39095.	44683.	56585.	68692.
		(7611.98)	(	455.38)(	949.43)(	1107.04)(	1265.28)(	1602.30)(	1945.15)(
ROUTED TO	21	2939.00	1	15651.	32572.	37923.	43327.	54904.	66706.
		(7611.98)	(	443.19)(	922.33)(	1073.86)(	1226.88)(	1554.71)(	1888.91)(
HYDROGRAPH AT	19	98.00	1	5333.	10666.	13333.	15999.	21333.	26666.
		(253.82)	(	151.02)(	302.04)(	377.55)(	453.06)(	604.07)(	755.09)(
ROUTED TO	21	98.00	1	3197.	6395.	7993.	9592.	12789.	15986.
		(253.82)	(	90.54)(	181.07)(	226.34)(	271.61)(	362.15)(	452.68)(
2 COMBINED	21	3037.00	1	15710.	32683.	38062.	43494.	55127.	66985.
		(7865.79)	(	444.84)(	925.49)(	1077.80)(	1231.62)(	1561.02)(	1896.79)(
HYDROGRAPH AT	20	74.00	1	9096.	18191.	22739.	27287.	36383.	45478.
		(191.66)	(	257.56)(	515.12)(	643.90)(	772.68)(	1030.24)(	1287.80)(
ROUTED TO	20	74.00	1	179.	358.	456.	555.	757.	1124.
		(191.66)	(	5.06)(	10.13)(	12.93)(	15.72)(	21.44)(	31.83)(
ROUTED TO	21	74.00	1	177.	354.	451.	549.	745.	1098.
		(191.66)	(	5.01)(	10.02)(	12.78)(	15.54)(	21.08)(	31.08)(
2 COMBINED	21	3111.00	1	15877.	33016.	38484.	44007.	55821.	67932.
		(8057.45)	(	449.59)(	934.92)(	1089.74)(	1246.13)(	1580.66)(	1923.62)(
HYDROGRAPH AT	21	27.00	1	1584.	3168.	3959.	4751.	6335.	7919.
		(69.93)	(	44.85)(	89.69)(	112.12)(	134.54)(	179.39)(	224.24)(
2 COMBINED	21	3138.00	1	15903.	33065.	38545.	44079.	55918.	68053.
		(8127.38)	(	450.31)(	936.29)(	1091.46)(	1248.19)(	1583.41)(	1927.06)(
ROUTED TO	22	3138.00	1	15786.	32815.	38247.	43745.	55465.	67485.
		(8127.38)	(	447.01)(	929.21)(	1083.04)(	1238.71)(	1570.59)(	1910.96)(
HYDROGRAPH AT	22	98.00	1	7764.	15527.	19409.	23291.	31055.	38819.
		(253.82)	(	219.84)(	439.69)(	549.61)(	659.53)(	879.38)(	1099.22)(
2 COMBINED	22	3236.00	1	15827.	32898.	38351.	43869.	55630.	67692.
		(8381.20)	(	448.18)(	931.55)(	1085.97)(	1242.23)(	1575.27)(	1916.82)(
ROUTED TO	22	3236.00	1	15035.	27531.	32506.	37545.	48117.	58777.
		(8381.20)	(	425.76)(	779.59)(	920.48)(	1063.17)(	1362.53)(	1664.38)(
ROUTED TO	26	3236.00	1	14971.	27442.	32406.	37409.	47930.	58540.
		(8381.20)	(	423.92)(	777.07)(	917.62)(	1059.30)(	1357.23)(	1657.66)(
HYDROGRAPH AT	23	42.70	1	4418.	8835.	11044.	13253.	17671.	22089.
		(110.59)	(	125.10)(	250.19)(	312.74)(	375.29)(	500.38)(	625.48)(
ROUTED TO	23	42.70	1	748.	1736.	2000.	2218.	4376.	6539.
		(110.59)	(	21.18)(	49.17)(	56.63)(	62.81)(	123.91)(	185.17)(

ROUTED TO	25	42.70	1	586.	1319.	1667.	1911.	2720.	3610.
		(110.59)	(	16.59)(	37.35)(	47.21)(	54.13)(	77.03)(	102.22)(
HYDROGRAPH AT	24	68.00	1	5101.	10202.	12753.	15304.	20405.	25506.
		(176.12)	(	144.45)(	288.90)(	361.13)(	433.35)(	577.80)(	722.25)(
ROUTED TO	24	68.00	1	1160.	1515.	1628.	1743.	1909.	2000.
		(176.12)	(	32.85)(	42.90)(	46.11)(	49.35)(	54.05)(	56.63)(
ROUTED TO	25	68.00	1	1085.	1481.	1594.	1707.	1874.	2000.
		(176.12)	(	30.72)(	41.95)(	45.13)(	48.33)(	53.05)(	56.63)(
2 COMBINED	25	110.70	1	1656.	2800.	3261.	3618.	4594.	5610.
		(286.71)	(	46.91)(	79.29)(	92.33)(	102.46)(	130.09)(	158.85)(
HYDROGRAPH AT	25	102.00	1	5570.	11141.	13926.	16711.	22282.	27852.
		(264.18)	(	157.74)(	315.48)(	394.34)(	473.21)(	630.95)(	788.69)(
2 COMBINED	25	212.70	1	6264.	12169.	15086.	17971.	23907.	29854.
		(550.89)	(	177.37)(	344.58)(	427.20)(	508.89)(	676.97)(	845.38)(
HYDROGRAPH AT	25	72.00	1	3355.	6709.	8386.	10064.	13418.	16773.
		(186.48)	(	94.99)(	189.98)(	237.48)(	284.97)(	379.97)(	474.96)(
2 COMBINED	25	284.70	1	9262.	18165.	22581.	26965.	35899.	44844.
		(737.37)	(	262.26)(	514.37)(	639.43)(	763.56)(	1016.54)(	1269.85)(
ROUTED TO	26	284.70	1	5545.	10654.	13138.	15563.	20730.	25914.
		(737.37)	(	157.03)(	301.69)(	372.02)(	440.69)(	587.02)(	733.81)(
2 COMBINED	26	3520.70	1	17460.	28827.	34158.	39533.	50532.	61524.
		(9118.57)	(	494.42)(	816.30)(	967.24)(	1119.46)(	1430.91)(	1742.17)(
ROUTED TO	28	3520.70	1	16731.	28565.	33868.	39258.	50202.	61123.
		(9118.57)	(	473.76)(	808.86)(	959.02)(	1111.67)(	1421.55)(	1730.82)(
HYDROGRAPH AT	27	37.00	1	3278.	6556.	8195.	9834.	13112.	16390.
		(95.83)	(	92.82)(	185.64)(	232.06)(	278.47)(	371.29)(	464.11)(
ROUTED TO	28	37.00	1	2110.	4221.	5276.	6331.	8441.	10551.
		(95.83)	(	59.76)(	119.51)(	149.39)(	179.27)(	239.03)(	298.78)(
2 COMBINED	28	3557.70	1	16758.	28587.	33896.	39292.	50247.	61180.
		(9214.40)	(	474.52)(	809.50)(	959.82)(	1112.62)(	1422.83)(	1732.42)(
HYDROGRAPH AT	29	100.00	1	0.	0.	0.	0.	0.	0.
		(259.00)	(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(
ROUTED TO	30	100.00	1	0.	0.	0.	0.	0.	0.
		(259.00)	(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(
HYDROGRAPH AT	30	529.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1370.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
2 COMBINED	30	629.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1629.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
ROUTED TO	31	629.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1629.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
HYDROGRAPH AT	31	144.00	1	4722.	9444.	11804.	14165.	18887.	23609.
		(372.96)	(	133.71)(	267.41)(	334.27)(	401.12)(	534.83)(	668.53)(
2 COMBINED	31	773.00	1	28027.	56054.	70067.	84081.	112108.	140135.
		(2002.06)	(	793.63)(	1587.27)(	1984.09)(	2380.90)(	3174.54)(	3968.17)(

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HYDROGRAPH AT     31    105.00       1    5045.   10089.   12611.   15134.   20178.   25223.
                     (  271.95)       (  142.85)(  285.69)(  357.11)(  428.54)(  571.38)(  714.23)(

 2 COMBINED       31    870.00       1   32185.   64370.   88462.   96555.  128740.  160925.
                     ( 2274.01)       (  911.38)( 1822.75)( 2278.44)( 2734.13)( 3645.50)( 4556.88)(

HYDROGRAPH AT     31    288.00       1    8352.   16705.   20881.   25057.   33410.   41762.
                     (  745.92)       (  236.51)(  473.03)(  591.28)(  709.54)(  946.06)( 1182.57)(

 2 COMBINED       31   1166.00       1   36521.   73041.   91301.  109562.  146082.  182603.
                     ( 3019.93)       ( 1034.15)( 2068.29)( 2585.36)( 3102.44)( 4136.58)( 5170.73)(

HYDROGRAPH AT     31    269.00       1   19077.   38153.   47691.   57230.   76306.   95383.
                     (  696.71)       (  540.19)( 1080.38)( 1350.47)( 1620.57)( 2160.75)( 2700.94)(

 2 COMBINED       31   1435.00       1   42495.   84990.  106238.  127485.  169980.  212476.
                     ( 3716.63)       ( 1203.33)( 2406.65)( 3008.32)( 3609.98)( 4813.31)( 6016.64)(

ROUTED TO         31   1435.00       1    8666.   12305.   14086.   15877.   19464.   23053.
                     ( 3716.63)       (  245.38)(  348.44)(  398.87)(  449.59)(  551.15)(  652.79)(

ROUTED TO         32   1435.00       1    8666.   12305.   14086.   15877.   19464.   23053.
                     ( 3716.63)       (  245.38)(  348.44)(  398.87)(  449.59)(  551.15)(  652.79)(

HYDROGRAPH AT     32     28.00       1    1215.    2430.    3038.    3645.    4860.    6075.
                     (   72.52)       (   34.41)(   68.81)(   86.02)(  103.22)(  137.62)(  172.03)(

 2 COMBINED       32   1463.00       1    8804.   12502.   14309.   16118.   19761.   23409.
                     ( 3789.15)       (  249.30)(  354.01)(  405.18)(  456.41)(  559.58)(  662.86)(

ROUTED TO         28   1463.00       1    8756.   12431.   14229.   16032.   19659.   23289.
                     ( 3789.15)       (  247.95)(  352.02)(  402.92)(  453.98)(  556.69)(  659.47)(

 2 COMBINED       28   5020.70       1   25503.   39439.   46390.   53847.   67711.   81954.
                     (13003.55)       (  722.17)( 1116.79)( 1313.85)( 1523.45)( 1917.35)( 2320.69)(

HYDROGRAPH AT     28    110.00       1    3626.    7251.    9064.   10877.   14503.   18128.
                     (  284.90)       (  102.67)(  205.34)(  256.67)(  308.01)(  410.67)(  513.34)(

 2 COMBINED       28   5130.70       1   26136.   40630.   46955.   53627.   67951.   82255.
                     (13288.45)       (  740.08)( 1150.75)( 1329.62)( 1518.56)( 1924.16)( 2329.28)(

ROUTED TO         33   5130.70       1   26021.   40459.   46768.   53381.   67656.   81891.
                     (13288.45)       (  736.83)( 1145.67)( 1324.32)( 1511.58)( 1915.79)( 2318.89)(

1********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 ********************************
0
TERMINAL  325 TIME OUT.


CON= 3:24 NOU=     7.366

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Table I-1: Physical Characteristics of Lakes in the Basin

Name	Regulating Agency	Drainage Area (sq.mi.)	Surface Area (sq.mi.)	Shoreline (miles)	Principal Regulation Purpose
Canandaigua Lake	City of Canandaigua	184	16.57	36	WS,WQ,FC,Rec.
Keuka Lake	Village of Penn Yan	179	17.43	19	WS,SQ,Rec.,FC
Seneca Lake	N.Y. Electric & Gas Co. & N.Y.S. Dept. of Transportation	714	66.9	75	WS,Nav.,P,FC, Rec.
Cayuga Lake	N.Y.S. Dept. of Transportation	780	66.4	85	WS, Nav., Rec. FC
Owasco Lake	City of Auburn	206	10.25	25	WS,WQ,FC,Rec.
Skaneateles Lake	City of Syracuse	74	13.8	33	WS,SQ,FC,Rec.
Otisco Lake	Onondaga County Water Authority	42.7	3.4	13	WS,SQ,FC, Rec.
Oneida Lake	N.Y.S. Dept. of Transportation	1382	79.8	55	Nav.,FC, Rec.

WS = Water Supply
WQ = Water Quality
FC = Flood Control
Nav. = Navigation
P = Power
Rec. = Recreation

HYDRAULICS

RATING CURVE AT LOCK O-3, FULTON

(PREPARED BY D.E.C., NOT USED IN HEC-1 ANALYSIS PMF COMPUTATIONS)

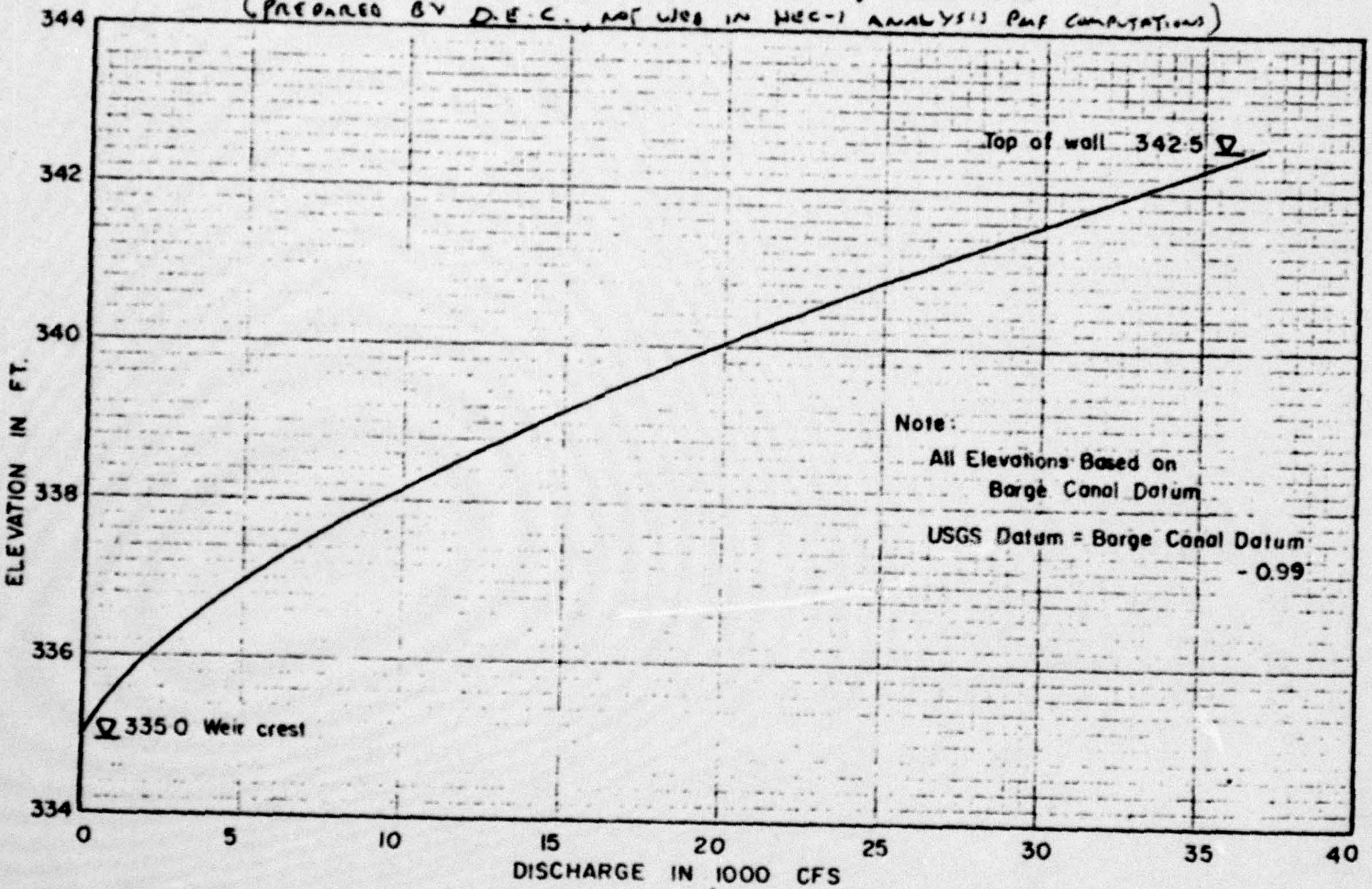


PLATE V-6(h)

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: New York State Dam Inspection — DATE: 6-20-79

SUBJECT: Lower Fulton Dam - Lock #3 — PROJECT NO. 2305

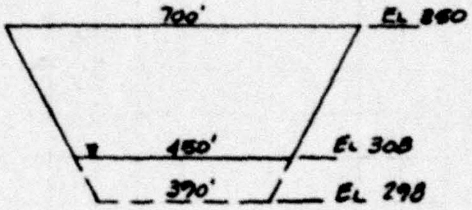
Stage - Discharge Relationship — DRAWN BY: JPG & NFD

Downstream Channel

Manning's Formula: $Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$; assume: $n = 0.035$

$S = 0.001$ ft/ft

$R = \frac{(b+2Y)Y}{b+2Y\sqrt{1+2^2}}$; $A = (b+2Y)Y$



Elev *	h	1.49/n	A	R	S	Q
308	0	42.57	4200	6.87	0.001	20564
310	2	↓	5112	10.66	↓	33596
312	4		6048	12.22		43556
314	6		7008	13.75		54621
316	8		7992	15.22		66677
318	10		9000	16.65		79743
320	12		10032	18.04		93793
322	14		11088	19.40		108839
324	16		12168	20.73		124866
326	18		13440	22.02		143612
328	20		14580	23.29		161758
330	22		15744	24.52		180800
332	24	42.57	16932	25.74	0.001	200872

* Elevation at location of section, 10000 ft above Lock #5 @ Minetto, N.Y. Translated upstream to toe of dam (Elev 318) discharge at submergence would be 134000± CFS.

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6·20·79

SUBJECT LOWER FULTON DAM - LOCK #3 PROJECT NO. 2305

STAGE - DISCHARGE RELATIONSHIP DRAWN BY JPG & NFD

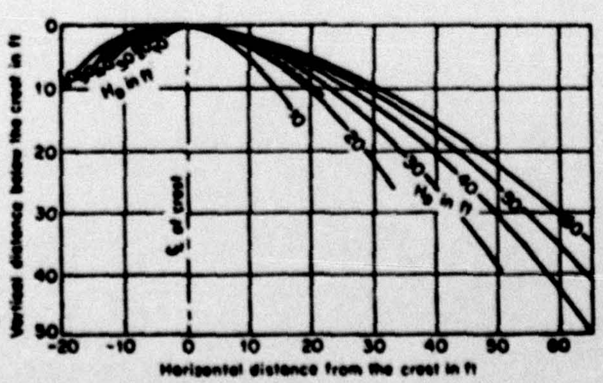
FREE WEIR FLOW (Ogee)

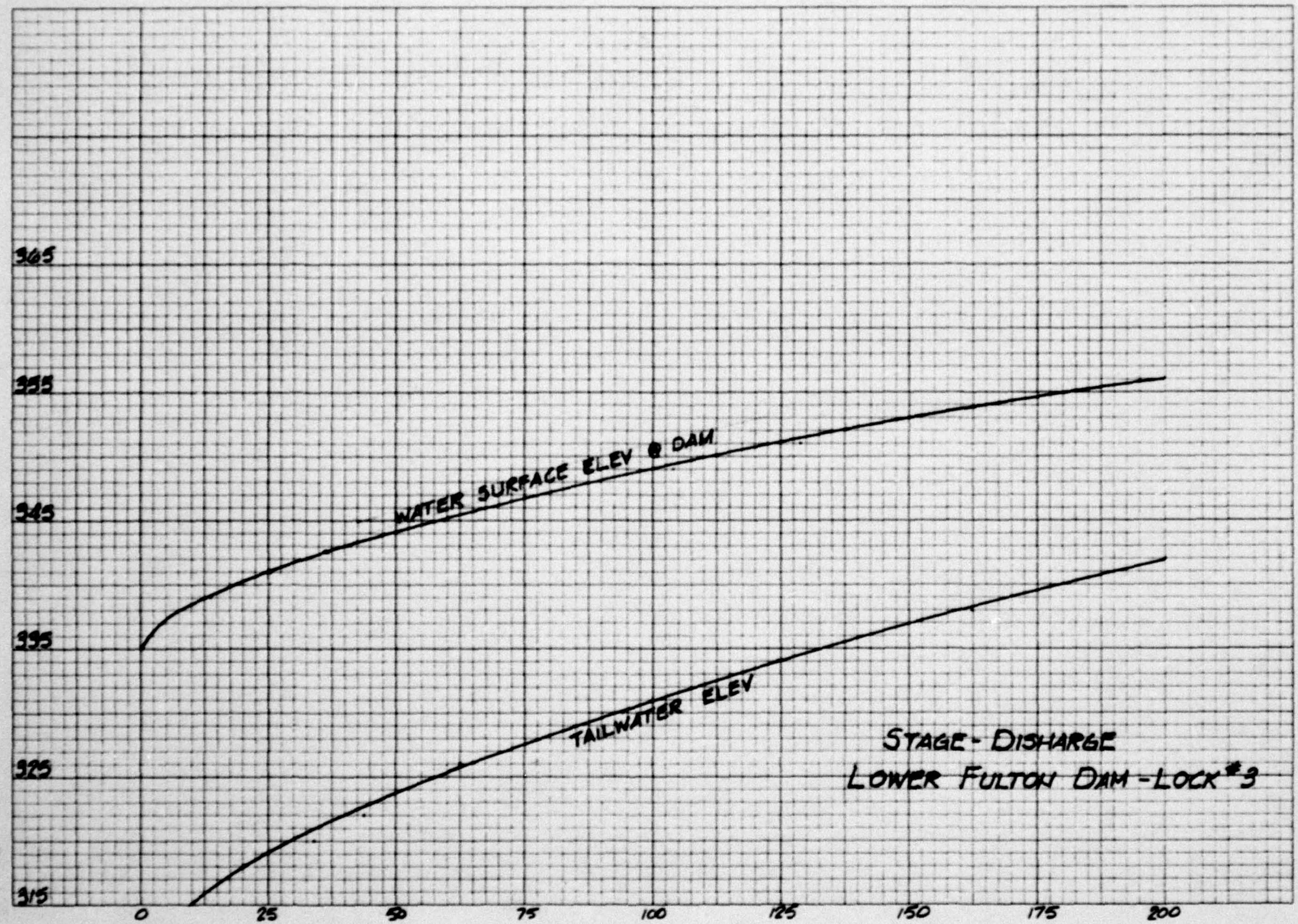
SPILLWAY - 509 FT LENGTH TOP OF DAM = 335.0'

Cd = 4.03 HEIGHT OF DAM = 17

Hd = 18.00' (ASSUME)

ELEV	He	He/Hd	C/Cd	C	$Q = C \ell He^{1.5}$
335	0	0	0	0	0
337	2	.111	.75	3.023	4352
339	4	.222	.80	3.224	13128
341	6	.333	.85	3.426	25629
343	8	.444	.87	3.506	40380
345	10	.556	.92	3.708	59684
347	12	.667	.94	3.788	80149
349	14	.778	.97	3.909	104226
351	16	.889	.98	3.949	128643
353	18	1.000	1.00	4.030	156650
355	20	1.111	1.01	4.070	185292
357	22	1.222	1.02	4.111	215925
359	24	1.333	1.025	4.131	247224




365
355
345
335
325
315
0
25
50
75
100
125
150
175
200
WATER SURFACE ELEV @ DAM
TAILWATER ELEV
STAGE - DISHARGE
LOWER FULTON DAM - LOCK #3

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PROJECT NAME New York State Dam Inspection DATE 6·15·79

SUBJECT Lower Fulton Dam - Lock #3 PROJECT NO. 2305

Stage - Storage Relationship DRAWN BY JPG

Elev	End Area (Acre)	Vol (Acre-Ft)	Storage (Acre-Ft)
316			
	.0242	6.3	6.3
318			
	.0250	19.1	25.4
320			
	.0257	33.4	58.8
322			
	.0264	48.1	106.9
324			
	.0272	63.7	170.6
326			
	.0279	94.9	265.5
328			
	.0287	97.6	363.1
330			
	.0293	99.6	462.7
332			
	.0301	102.3	565.0
334			
	.0308	104.7	669.7
336			
	.0316	107.4	777.1
338			
	.0323	109.8	886.9
340			
	.0331	112.5	999.4
342			
	.0338	114.9	1114.3
344			
	.0345	117.3	1231.6
346			
	.0353	119.0	1350.6
348			
	.0360	122.4	1473.0
350			
	.0367	124.8	1597.8
352			
	.0375	127.5	1725.3
354			
	.0382	129.8	1855.1
356			
	.0389	132.2	1987.3
358			
	.0397	135.0	2122.3
360			

APPENDIX D

STABILITY ANALYSIS

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PROJECT NAME: LOWER FULTON DAM - LOCK #3 DATE:

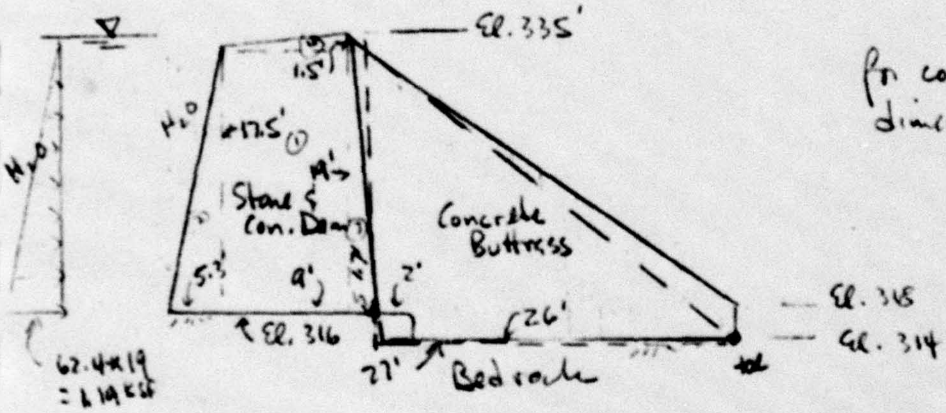
SUBJECT: STABILITY ANALYSIS - OVERTURNING & SLIDING PROJECT NO.:

DRAWN BY:

- see attached sheet for dam cross-section -

This is a modified buttress dam - use an analytical section extending from ℄ to ℄ between buttresses, then analyze as a gravity monolith.

c-c spacing for buttresses = 15.1'
buttress sections 3' wide



for computation; assume buttress dimensions are 21' height × 27' base tri

neglect mass of water between buttress cells

I. WL @ normal operating elevation (elev 335 upst, elev 315 ds)

(i) moments resisting overturning: mass of dam + mass of buttress + dam face

moment about toe = $(15.1' \text{ wide})\left[9\times17.5\times.15\left(28+\frac{9}{2}\right) + \left(\frac{1}{2}\times5.3\times17.5\times.15\right)\left(37+\frac{5.3}{3}\right) + \left(\frac{1}{2}\times19'\times1.7\times.15\right)\left(28+\frac{2}{3}\times1.7\right) + \left(\frac{1}{2}\times9\times1.5\times.15\right)\left(28+\frac{9}{3}\right)\right] + (3' \text{ wide})\left[\frac{1}{2}\times21\times27\times.15\left(\frac{2}{3}\times27\right)\right] + \left[62.4\times\frac{1}{2}\times17.5\times5.3\left(37+\frac{2}{3}\times5.3\right)\right]$

$= (15.1)(767.81 + 269.82 + 70.50 + 31.39) + (3)(765.45) + 118 =$

$= 17{,}208^{\text{'k}} + 2{,}296^{\text{'k}} + 1783^{\text{'k}} = 21{,}287.^{\text{'k}}$

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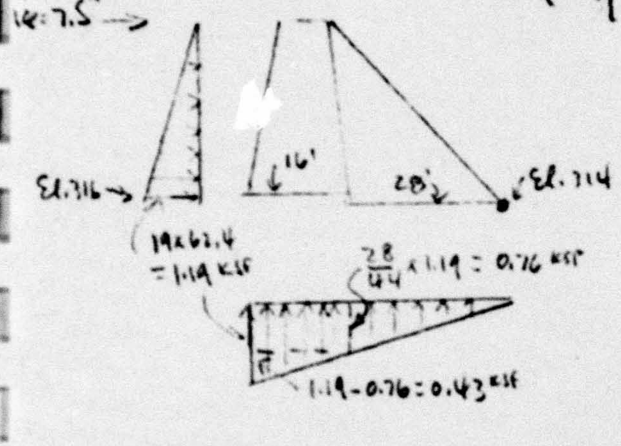
(ii) moments causing ovt : horiz. water pressure upstream + uplift + ice =

$$= (15')\left[\left(1.19 \times \frac{19}{2}\right)\left(\frac{19}{3} + 2'\right)\right] + (15')\left[(0.76 \times 16)\left(\frac{16}{2} + 28\right) + \left(\frac{1}{2} \times 0.43 \times 16\right)\left(\frac{2}{3} \times 16 + 28\right)\right] + (3')\left[0.76 \times \frac{28}{2} \times \frac{2}{3} \times 28\right]$$

$$+ (7.5^k \times 20')(15') =$$



$$= (15')[94.2] + (15')[437.8 + 133] + 595.6 + 100$$

$$= 1423^{1k} + 8619^{1k} + 596 + 2265 = 12{,}903^{1k}$$

FS against overturning =

(a) uplift only on 3' wide buttress section + 15' wide dam section } → $FS = \frac{21{,}287^{1k}}{12903^{1k}} = \underline{1.65 \pm}$ (uplift, ice acting) - ok

location of resultant measured from toe of dam, $d = \frac{\Sigma M_{toe}}{\Sigma V}$

$$= \frac{(21{,}287 - 12{,}903)^{1k}}{\underset{wt}{637^k} + \underset{H_2O}{43^k} - \underset{uplift}{266^k}} = \frac{8384}{414} = 20.25' \text{ from toe}$$

$$\underline{d} = \frac{20.25}{44}(b) = \underline{0.46\,b} \quad (ok)$$

(b) uplift on 15' wide section, both dam and buttress (if buttress base is on a structural slab extending full length of dam)

$$FS = \frac{21{,}287}{12903 - 596 + \frac{15}{3}(596)} = \frac{21{,}287}{13{,}192} = \underline{1.39} \quad \text{(uplift, ice act)}$$

location of resultant from toe, $d = \frac{\Sigma M_{toe}}{\Sigma V}$

$$= \frac{8384}{637 + 43 - 393} = \frac{8384}{287} = 29.2' \text{ from toe}$$

$$\underline{d} = \frac{29.2}{44}(b) = \underline{.66\,b}$$

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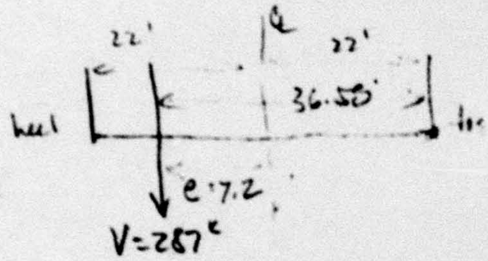
Estimating foundation contact stresses at toe and heel for case of uplift on full 15' wide section (dam and buttress)

$$I_{xx} = \frac{1}{12} bh^3 \text{ for 15' wide section} \qquad 44' \quad 15'$$

$$= \frac{1}{12}(15)(44 \times 44 \times 44) = 106,480 \text{ ft}^4$$



$$\sigma_{toe} = \frac{V}{A} - \frac{Mc}{I}$$

$$= \frac{287^k}{(15 \times 44)} - \frac{(287^k \times 7.2)(22)}{(106,480 \text{ ft}^4)} = 0.44 - .43$$

$$= 0.44 - .43 = +0.01 \text{ ksf (comp)}$$

$$\sigma_{heel} = \frac{V}{A} + \frac{Mc}{I} = 0.44 + 0.43 = 0.87 \text{ ksf}$$
(Comp)

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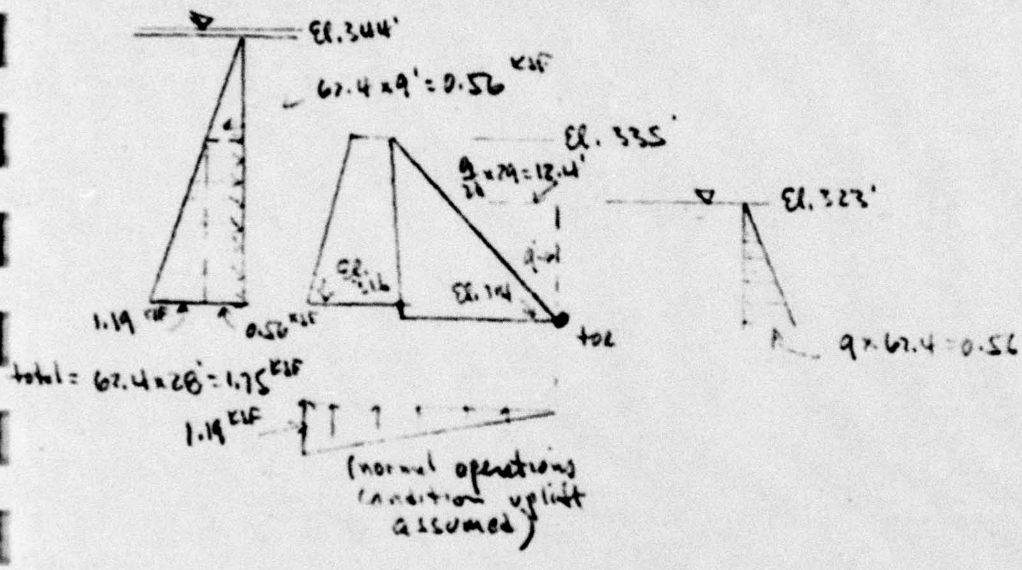
II WL @ ½ PMF elevations upstream and downstream
elev. 344' upstream, 9' above spillw
elev. 323' downstream



(i) moments about toe resisting overturning: mass of dam + dwst. H_2O + dwst. pre

$$= 19{,}504^{\prime k} + (15')\left(\frac{12.4 \times 9}{2} \times 62.4\right)\left(\frac{12.4}{3}\right) + (15')\left(\frac{9 \times 0.56}{2} \times \frac{9}{3}\right)$$

$$= 19{,}504 + 216 - 113 = 19{,}617^{\prime k}$$

(ii) moments causing overturning: upstream water pressure + uplift

(a) uplift acts on 15' dam and 3' buttress

$$= (15')\left[(0.56 \times 19)\left(\frac{19}{2} + 2\right) + \left(1.19 \times \frac{19}{2}\right)\left(\frac{19}{3} + 2\right)\right] + 9215^{\prime k} =$$

$$= 3249 + 9215 = 12{,}463^{\prime k}$$

<u>FS</u> against overturning $= \frac{19{,}617}{12{,}463} = \underline{1.57}$

location of resultant, $\underline{d} = \frac{\Sigma M_{toe}}{\Sigma V} = \frac{(19{,}617 - 12{,}463)}{637 - 266.43 + (15 \times \frac{12.4 \times 9}{2} \times 62.4)} = \underline{15.3}$

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SUBJECT ____ PROJECT NO. ____
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location of resultant in terms of b

$$\underline{d} = \frac{15.3}{44}(b) = 0.\underline{35}(b)$$

(b) uplift acts on 15' wide dam and buttress section

FS against overturning =

$$\underline{FS} = \frac{19,617}{3249 + 8619 + \frac{15}{3}(596)} = \underline{1.32}$$

14848

location of resultant, $d = \frac{\Sigma M_{toe}}{\Sigma V}$

7154

$$\underline{d} = \frac{(19,617 - 14,848)^{k}}{(637 - 393 + 43 + 52)^{k}} = \frac{7154^{k}}{339} = \underline{21.1}'$$

in terms of base width, b

$$\underline{d} = \frac{21.1}{44}(b) = 0.\underline{48}(b)$$

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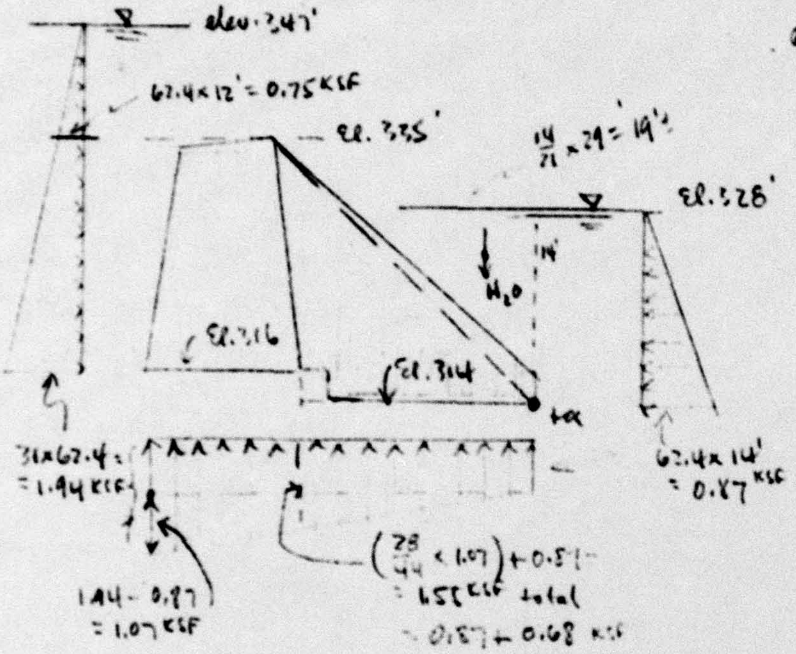
______ DRAWN BY ______

III. WL @ PMF elevations upstream and downstream

elev. 347' upstream, 12' above spillway,
elev. 328' downstream



as for I, analyze dam section length 15' wide

neglect this uplift pressure diagram, assume uplift for the normal spring condition from I(II)

(i) moments about toe resisting overturning: mass of dam + upstream wt. H_2O + upst. pre

dam & buttress

$= 19{,}504^{\prime k} + (15')\left(\frac{1}{2} \times 14 \times 19 \times 62.4 \times \frac{19}{3}\right) + (15')\left(0.87 \times \frac{14}{2} \times \frac{14}{3}\right) =$

$= 19{,}504 + 788 + 426 = 20{,}718^{\prime k}$

(ii) moments causing overturning: upst. water pressure + uplift =

$= (15')\left[(0.75 \times 19)\left(\frac{19}{2}+2\right) + \left(19 \times 62.4 \times \frac{19}{2}\right)\left(\frac{19}{3}+2\right)\right] + 9215^{\prime k} = 3866 + 9215 = 13{,}081^{\prime k}$

$\underline{FS}$ against overturning $= \frac{20{,}718^{\prime k}}{13{,}081^{\prime k}} = \underline{1.58}$

(2) uplift acts on 15' base for dam and 3' buttress apron

location of resultant d from toe: $d = \frac{\Sigma M_{toe}}{\Sigma V}$

$= \frac{20{,}718 - 13{,}081}{637 + 43 - 266 + 114} = \frac{7637^{\prime k}}{538^{k}} = 14.20$

$= 14.2/44 = 0.3$

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(b) uplift on 15' wide buttress and dam section

overturning moment = ups. water press + uplift

$= 3866 + 8619 + \frac{15}{3}(596) = 15,465^{1k}$

$\underline{FS}$ against overturning $= \frac{20,718^{1k}}{15,465^{1k}} = \underline{1.34}$

location of resultant, d, from toe

$d = \frac{\Sigma M_{toe}}{\Sigma V} = \frac{(20,718 - 15,465)^{1k}}{637 - 393 + 124 + 43} = \frac{5253^{1k}}{411} = 12.78'$

$\underline{d} = \frac{12.78}{44}(b) = 0.\underline{29\ (b)}$

– SLIDING –

I. WL @ normal pool level

(i) wt. of dam $= 15' \times \left[(9 \times 17.5 \times .15) + (\frac{5.3}{2} \times 17.5 \times .15) + (\frac{19}{2} \times 1.7 \times .15) + (\frac{9}{2} \times 1.5 \times .15\right.$

buttress

$+ 3' \times \left[\frac{1}{2} \times 21 \times 27 \times .15\right] = 510 + 128 = 637^{k}$

(ii) wt. water above upstream face $= (15')\left[62.4 \times \frac{17.5}{2} \times 5.3\right] = 43^{k}$

(ii) lateral water pressures

upstream $(1.19 \times \frac{19}{2}) = 11.3^{k} \times 15'$ wide $= 170^{k}$

(iii) uplift $= (1.19 \times \frac{44}{2}) = 26.2^{k} \times 15'$ wide $= 393$

dam and buttress approx 15' wide

uplift $= \left[(0.76 \times 16) + (0.43 \times \frac{16}{2})\right] 15'$ wide $+ \left[(0.76 \times \frac{28}{2}\right] 3'$ wide $= 266^{k}$

for dam 15' wide buttress 3' wide

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5

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FS against sliding (friction-shear method, using 50 psi bond between dam concrete and bedrock, $\mu = 0.65$)

$$= \frac{\mu N + \text{bond/shear}}{\text{horiz. water pressure} + \text{ice}}$$

$$= \frac{(0.65)(637 - 266 + 43) + (.050)\left[(144 \times 16')(15') + (144 \times 28' \times 3')\right]}{170^k + 7.5^k(15)}$$

$$\underline{FS} = \frac{269 + 2333}{282.5} = \underline{9.2} \pm$$

normal (uplift, ice act)

II. WL @ $\frac{1}{2}$ PMF elevations

(i) wt. of dam $= 637^k$
(ii) wt. H_2O above upstream face $= 43^k$
(iii) wt. H_2O above downstream face $= (15')\left(\frac{12.4 \times 9}{2} \times 62.4\right) = 52^k$
(iv) lateral water pressure upstream $= \frac{1}{2}(0.56 + 1.75)(19')(15') = 329^k$
(v) lateral water press downstream $= \left(0.56 \times 9 \times \frac{1}{2}\right)(15') = 38^k$

FS against sliding (friction-shear method), using factors as before

$$\underline{FS} = \frac{(0.65)(637 + 43 + 52 - 266) + 2333 + 38}{329} = \underline{8} \pm$$

(normal uplift acts)

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PROJECT NAME ______ DATE ______

SUBJECT ______ PROJECT NO. ______

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III. WL @ PMF elevations

(i) wt. of dam = 637^k

(ii) lateral water pressures

upstream = $\left(\frac{0.75+1.94}{2}\right)(19') = 25.6^k \times 15' = 384^k$

downstream = $\left(0.87 \times \frac{14}{2}\right) = 6^k \times 15' = 90^k$

(iii) wt. water on downstream face of dam (vertical force) =

$= \left(\frac{14 \times 19}{2}\right)(62.4) = 8.3^k \times 15' = 124.5^k$

(iv) uplift =

$= 15'\left[\left(\frac{1.94+1.55}{2}\right)(16')\right] + 3'\left[\left(\frac{1.55+0.87}{2}\right)(28')\right]$

$= 419^k + 102^k = 521^k$

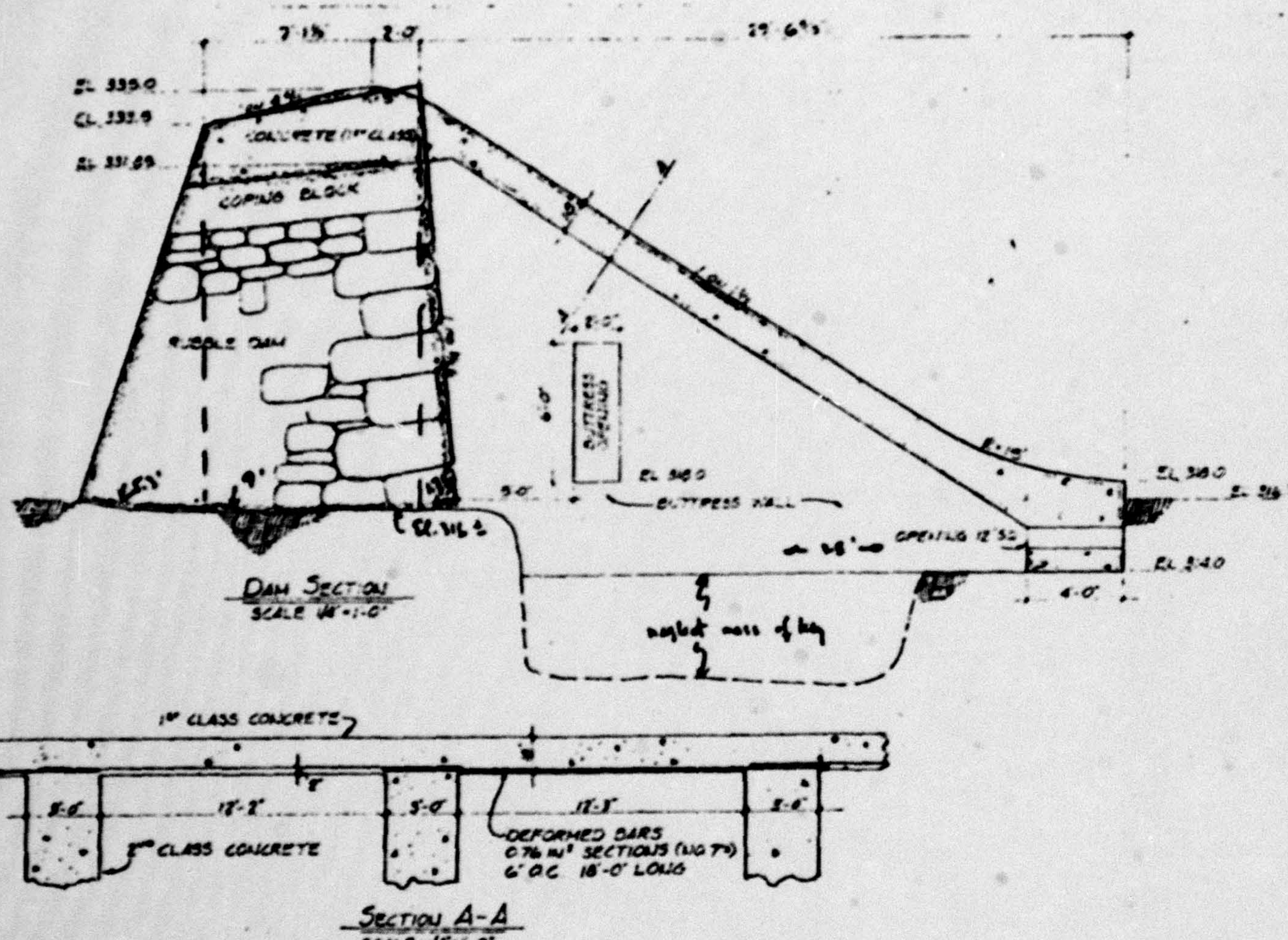
use 266^k upl. (normal operating conditions)

FS against sliding (friction-shear method), using factors as before

$$\underline{FS} = \frac{(0.65)(637+124+43-266) + 2333^k + 90^k}{384^k} = \underline{7}^{\pm}$$

(normal uplift acts)

.06



STETSON • DALE

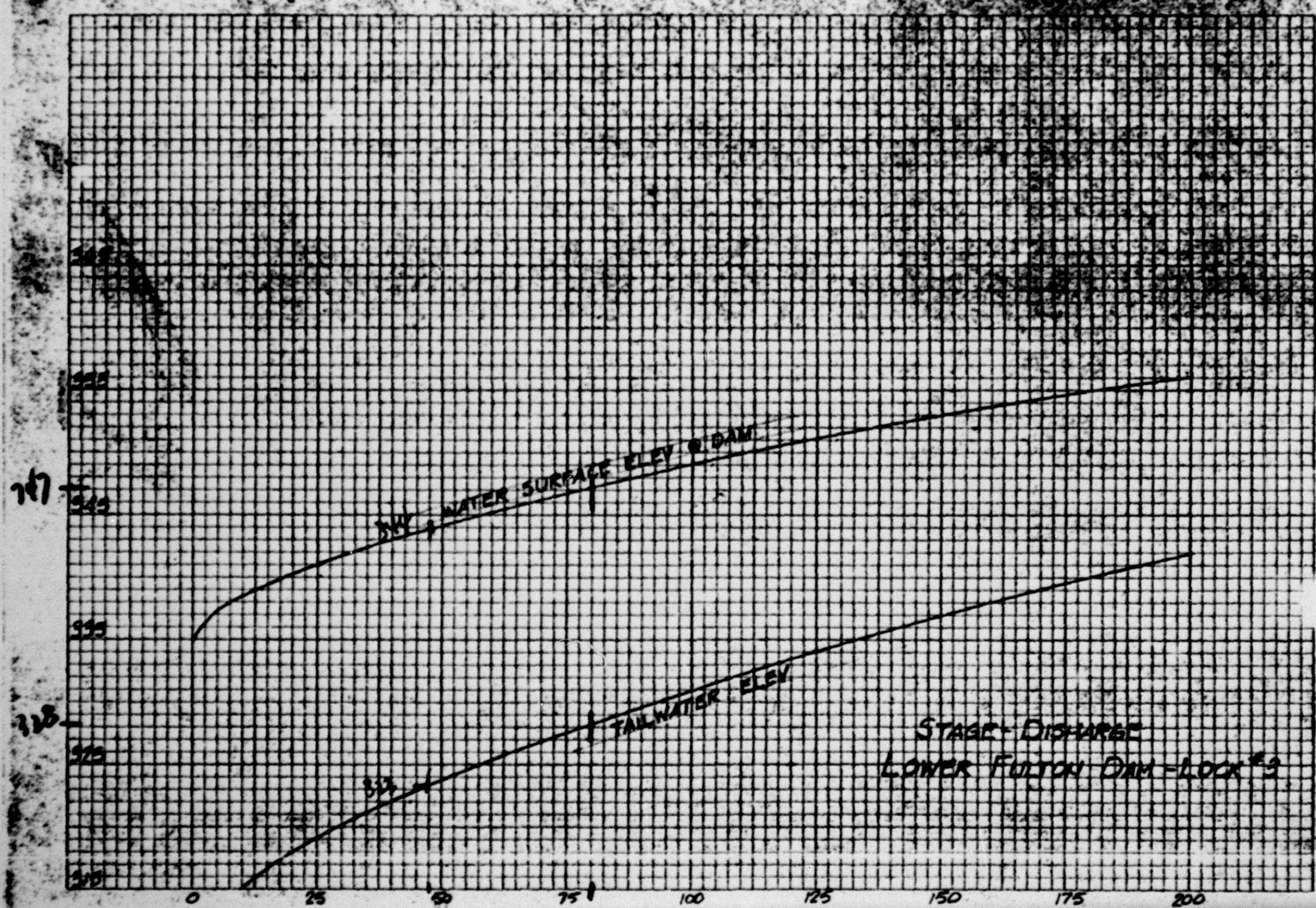
LOWER FULTON DAM
LOCK NO 3

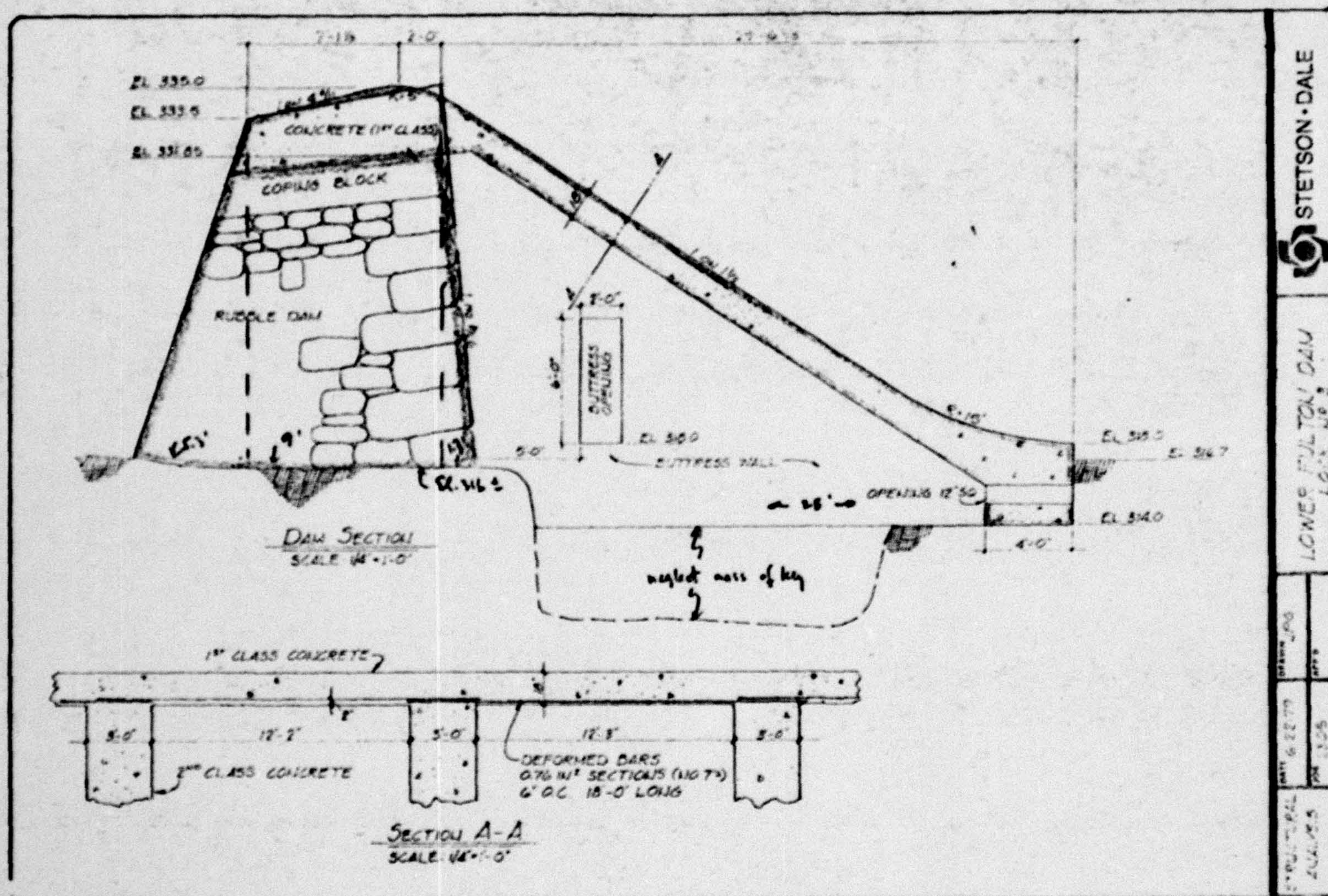
STRUCTURAL ANALYSIS

DATE 6-22-79 | BY JPG

JOB 2506

NO. 340-10 DIETZGEN GRAPH PAPER
10 X 10 PER INCH
DIETZGEN CORPORATION
MADE IN U.S.A.




STETSON·DALE
LOWER FULTON DAM
LOCK No 2
STRUCTURAL ANALYSIS
EL 335.0
EL 333.5
EL 331.85
CONCRETE (1st CLASS)
COPING BLOCK
RUBBLE DAM
BUTTRESS OPENING
EL 320.0
BUTTRESS WALL
OPENING 12'-3"
EL 316.7
EL 314.0
5'-0"
4'-0"
neglect mass of key
DAM SECTION
SCALE 1/4"=1'-0"
1st CLASS CONCRETE
2nd CLASS CONCRETE
DEFORMED BARS
0.76 IN² SECTIONS (NO 7's)
6" O.C. 18'-0" LONG
12'-2"
12'-3"
SECTION A-A
SCALE 1/4"=1'-0"

APPENDIX E

REFERENCES

APPENDIX

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